United States Court of Appeals
for the Second Circuit

JOINT APPENDIX

76-7233

United States Court of Appeals

FOR THE SECOND CIRCUIT

Docket No. 76-7233

B
P/S

PRESSURE SCIENCE INCORPORATED,
Plaintiff-Appellant,

—v.—

DAVID KRAMER and THE ADVANCED PRODUCTS COMPANY,
Defendants-Appellees.

ON APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF CONNECTICUT

JOINT APPENDIX

UNITED STATES COURT OF APPEALS
FILED
AUG 13 1976
A. DANIEL FUSARO, CLERK
SECOND CIRCUIT

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Relevant Docket Entries

DATE	
1973	
12/ 6	Complaint, Notice to Clerk, Motion for Preliminary Injunction and Notice of Motion, Motion for Leave to Take Deposition of Parties within Thirty Days of Service of Complaint and Order thereon granting same (Newman, J.), and Motion for Appointment of Person (Charles H. Barrett) to Serve Process and Order thereon (Markowski, C.), filed and entered. Summons issued and together with copies of same and of Complaint, Motions and Orders, handed to Attorney. M-12/6/73
12/14	Appearance of Attys. Carter LaPrade and Robert N. Schmalz entered for defendant, David Kramer.
12/14	Appearance of Attys. William J. Doyle and Shaun S. Sullivan entered for defendant, The Advanced Products Company.
12/17	Plaintiff's Motion for Preliminary Injunction "Over to 1/2/74 at 10:30 A.M." Zampano, J., M-12/17/73.
1974	
1/ 2	Plaintiff's Motion for Preliminary Injunction "over to Jan. 21st by agreement." Zampano, J. M-1/2/74.
1/22	Plaintiff's Motion for Preliminary Injunction, endorsed as follows: "Motion off, without prejudice, by agreement." Zampano, J. M-1/22/74. Copies mailed.
1/23	Answer, filed by defendant The Advanced Products Company.

DATE	
1974	
2/11	Plaintiff's Brief in Support of Preliminary Injunction, filed.
2/11	Chambers conference re Plaintiff's Motion for Preliminary Injunction. "Over to 3/1 at 2:00 for Chambers Conference". Zampano, J. M-2/13/74.
2/15	Deposition of Bernard Sadoff, Jr., filed. (Sealed per Court Order)
2/15	Deposition of Dudley Taylor, filed. (Sealed per Court Order)
3/14	Interrogatories, filed by defendant Advanced Products Company.
3/28	Answer, filed.
1974	
4/ 3	Plaintiff's Objections to Defendant The Advanced Products Company's Interrogatories 1 Through 46 and 49, filed.
4/ 3	Appearance of David W. Schneider, entered for plaintiff.
4/15	Plaintiff's Answers to defendant The Advanced Products Company's Interrogatories, filed and sealed pursuant to Protective Order.
4/22	Request for Admission, filed by Plaintiff.
5/ 1	Request for Admission, filed by Plaintiff.
5/14	Deposition of Douglas C. Manchester, Esq., filed.
5/14	Addendum to Transcript of the Deposition of Mr. Douglas C. Manchester, filed.

Relevant Docket Entries

DATE	
1974	
6/25	Request for Early Trial of the Issues Raised in Counts I and II of the Complaint, filed by plaintiff.
6/27	Response to Plaintiff's Request for Admission, filed by defendant David Kramer.
6/27	Response to Plaintiff's Request for Admission, filed by defendant The Advanced Products Company.
8/ 7	Deposition of Herbert J. Bock, filed.
11/ 6	Pretrial Memorandum, filed by defendant David Kramer.
11/ 6	Pre-Trial Memorandum, filed by plaintiff.
11/13	Replies to Advanced Products' Counterclaims, filed by Plaintiff.
1975	
3/ 4	Motion For Separate Trials, filed by plaintiff.
3/14	Order endorsed on Plaintiff's Motion for Separate Trials ((a) of the issues of liability and damages raised in Counts I and II of the complaint; and (b) a severance of the issues raised in Count III of the complaint and separate trial of such issues to a jury), *granting* same. Zampano, J. M-3/17/75. Copies mailed.
3/25	Court Trial Commences on severed issues. Court allows parties to make opening statements. 1 Plaintiff's witness sworn and testified. Plaintiff's Exhibits 1, 2-A thru 2-G, 3 thru 7, 7-A, 7-B, 8, 9, 9-A, 10, 11, 11-A, 11-B, 12-14, 14-A, 15 thru 17, 17-A and 18 filed. Court adjourned at 4:55 P.M. to 10:30 A.M. 3/26/75. Zampano, J. M-3/26/75.

Relevant Docket Entries

DATE	
1975	
3/26	Court Trial Continues. Plaintiff's Motion to have proceedings held in camera—granted. Court orders notes and exhibits sealed until further Order of this Court. Plaintiff's witness Bernard Sadoff resumes the stand for further testimony. Plaintiff's exhibits 19, 20, 20-A thru 20-M, 21 thru 52 filed. Defendants' Exhibit A filed. Court adjourned at 4:30 P.M. to 10:30 on 3/27/75. Zampano, J. M-3/27/75
3/27	Court Trial Continues. Plaintiff's witness Bernard Sadoff resumes the stand for further testimony. Defendants' Exhibits B thru I filed. Plaintiff's motion to release Court Reporter's notes from sealing —Granted. Court adjourned in this case to Tues., 4/1/75 at 10:30. Zampano, J. M-3/31/75
4/ 1	Court Trial Continues. Plaintiff's witness Bernard Sadoff resumes the stand for further examination. Defendants' Exhibits J, K, L, KR-1 thru KR-6 filed. Plaintiffs' Exhibits 53 thru 56 filed. 1 Plaintiff's witness sworn and testified. By agreement of Court and counsel, case at this point is not under seal. 3:57 Case at this point is under seal (Plaintiff's Exhibit 54, 55 & 56 filed at this point). Court adjourned in this case at 4:40 P.M. until 10:30 A.M. 4/2/75. Zampano, J. M-4/2/75
4/ 2	Court Trial Continues. Plaintiff's witness Dudley Taylor resumes stand for further testimony. Plaintiff's Exhibits 57 thru 70 filed. Court adjourned at 1:00 P.M. until 4/3/75 at 10:30 A.M. Zampano, J. M-4/3/75

Relevant Docket Entries

DATE	
1975	
4/ 3	Court Trial continues. Plaintiff's witness Dudley Taylor resumes stand for further testimony. Plaintiff's Exhibits 61-A and 61-B filed. Defendants' Exhibits KR-7 thru KR-11 filed; M and N filed. Court adjourned at 4:30 P.M. until 4/4/75 at 10:30 A.M. Zampano, J. M-4/3/75
4/ 4	Court Trial continues. Plaintiff's witness Dudley Taylor resumes stand for further testimony. Defendants' Exhibits KR 12 and O thru R filed. Plaintiff's witness David Kramer sworn and testified. Court adjourned at 1:05 P.M. until 4/8/75 @ 10:30 A.M. Zampano, J. M-4/4/75
4/ 8	Court trial continues. Plaintiff's witness David Kramer resumes the stand for further testimony. Plaintiff's Exhibits 71 thru 75, 75A filed. Plaintiff's Exhibit 76 marked for Iden. Plaintiff's witness Harvey R. Sommer testified. Court adjourned in this case at 4:45 P.M. to 10:30 A.M. 4/9/75. Zampano, J. M-4/9/75
4/ 9	Court Trial Continues. Plaintiff's witness Harvey Sommer resumes the stand for further testimony. Plaintiff rests at 11:29. Defendants' witness, Harvey Sommer, previously sworn as Pltf. witness, resumes the stand and testified. Defendants' Exhibits S thru Z; and and AA thru HH filed. Court adjourned at 4:30 P.M. until 10:30 A.M., 4/10/75 Zampano, J. M-4/10/75

DATE	
1975	
4/10	Court Trial Continues. Defendants' witness Harvey Sommer resumes the stand for further examination. Defendants' Exhibits II filed; JJ marked for ident.; KK thru TT filed. 1 Defendants' witness sworn and testified. Court adjourned at 4:30 P.M. until 10:30 A.M. 4/11/75. Zampano, J. M-4/11/75
4/11	Court Trial Continues. Defendants' witness Bernard Sniegowski resumes the stand for further testimony. Defendants' Exhibits UU thru ZZ; and AB thru AI filed. Court adjourned at 12:45 P.M. until 10:30 A.M., 4/15/75. Zampano, J. M-4/11/75
4/15	Court Trial continues at 11:25. Defendants' witness Bernard Sniegowski resumes the stand for further testimony. Defendants' exhibits AJ thru AZ; and BA thru BE, filed. Court adjourned at 4:40 P.M. until 4/16/75 at 10:30 A.M. Zampano, J. M-4/16/75
4/16	Court Trial Continues. Witness Sniegowski resumes stand for continued direct examination. Defendants' Exhibits BF thru BO and BQ thru BX filed. Court adjourned at 1:40 P.M. to Thursday April 17, 1975 at 10:30 A.M. Zampano, J. M-4/16/75
4/17	Court Trial Continues. Witness Sniegowski resumes stand for continued direct examination. Defendants' Exhibits BY, BZ; CA thru CG filed. Plaintiff's Exhibits Nos. 77 and 78 marked for identification. 1 Defendants' witness sworn and testified. Court adjourned at 4:50 P.M. Evidence to continue

DATE	
1975	
	until Tues., April 22, 1975 at 2 P.M. However, Court and counsel will meet at Advanced Products Co. in North Haven at 9 A.M. on 4/22/75 to view plant. Zampano, J. M-4/18/75
4/22	Court Trial continues. Defendants' Exhibits CH-1 thru CH-13, and CH-15 thru CH-23 filed. Testimony of witness Hostage interrupted and Clive Diggens of Bloomfield sworn and testified. Defendants' Exhibits CI, CJ, CK, CL-1 thru CL-3 filed. Plaintiff's Exhibit #79 filed. Defendants' witness Arthur Hostage, whose testimony was interrupted, resumes stand for further testimony. Court adjourned at 4:15 P.M. to April 23, 1975 at 10:30. Zampano, J. M-4/22/75
4/23	Court Trial Continues. 1 Defendants' witness sworn and testified. Defendants' Exhibits CM filed; CN marked; CO thru CT, filed. Court adjourned at 12:55 until 10:30 4/30/75. Zampano, J. M-4/23/75
4/30	Court Trial continues. One witness for defendant sworn and testified. Deft. Ex. CU and CV, filed. Deft. Ex. CN made a full exhibit. 12:55 Court adjourned to 5/1/75 at 10:30 A.M. Zampano, J. M-4/30/75.
5/ 2	Court Trial Continues. Plaintiff's Rebuttal witness Bernard Sadoff, Jr., previously sworn, resumes the stand and testified. Plaintiff's Exhibits 80 thru 85 filed. Plaintiff's Exhibits 77 and 78 admitted as full exhibits. Court adjourned in this case to 10:30 Tues., 5/6/75. Zampano, J. M-5/5/75

DATE	
1975	
5/ 6	Court Trial continues. Plaintiff's rebuttal witness Bernard Sadoff resumes the stand for further testimony. Plaintiff's rebuttal witness Dudley Taylor previously sworn, resumes the stand and testified. Plaintiff's Exhibits 86, 87 & 88 filed. Defendants' Exhibits CW and CX filed. Court adjourned at 1:25 to May 7th at 12:30. Zampano, J. M-5/7/75
5/ 7	Court Trial continues. 1 Defendants' witness sworn and testified. All parties rest at 1:18. Plaintiff's Motion for Dismissal of Def. The Advanced Products Co. Second Counterclaim and Brief in Support of Motion, filed. The Court will use the brief in its Findings. Counsel stipulate that because of the bulkiness of the exhibits they need not be sealed, but instead not be shown to the public. Counsel to inform the Court on scheduling of briefs and oral arguments. Decision Reserved. Court adjourned at 1:40. Zampano, J. M-5/8/75 Def. Exh. Q is missing and will be replaced by Mr. Sullivan.
6/ 3	Notice of Motion And Motion For Permanent Injunction, filed by plaintiff.
9/ 3	Plaintiff's Proposed Findings of Fact 1-370 and Proposed Conclusions of Law filed.
9/ 4	Defendant David Kramer's Proposed Findings of Fact filed.

Relevant Docket Entries

DATE	
1975	
9/ 4	Defendant The Advanced Products Company's proposed Findings Of Fact filed.
9/ 4	Stipulation Regarding Proposed Findings of Fact filed.
9/ 5	Plaintiff's Post-Trial Brief filed.
9/12	Conclusions of Law, filed by Advanced Products Co.
9/16	Hearing on Oral Argument (After Trial) Court states certain comments for the record. (Decision Reserved). (Zampano, J.) M-9/16/75.
9/19	Motion for Post-Trial Re-Argument and Memorandum in Support of Motion, filed by Defendant Advanced Products Co.
9/24	Plaintiff's Brief in Opposition to Motion for Post-Trial Re-Argument, filed.
10/15	Order endorsed on Defendant's, The Advanced Products Company's Motion for Post-Trial Re-Argument, *denying* same. Zampano, J. M-10/15/75 Copies mailed.
1976	
4/15	Memorandum of Decision filed. * . . . Accordingly, It is ordered that judgment is entered on the complaint for the defendant and judgment is entered on the counterclaim for the plaintiff. (Zampano, J.) M-4/19/76. Copies Mailed.

Relevant Docket Entries

DATE	
1976	
4/19	Judgment entered. "It is Ordered and Adjudged: that Judgment be and is hereby entered in favor of the defendants dismissing the complaint; and that Judgment be and is hereby entered in favor of the plaintiff dismissing the counterclaim". (Markowski, C.) M-4/19/76. Copies Mailed.
5/12	Notice of Appeal filed by plaintiff. Copy mailed to U.S.C.A. with copy of docket entries. Copies mailed to all counsel of record.
5/12	Bond for Costs on Appeal filed by plaintiff. Copy mailed to U.S.C.A.
5/12	Application For Stay of Judgment filed by plaintiff.
5/18	Endorsement entered on plaintiff's Application For Stay of Judgment as follows: "Granted, absent objection." (Zampano, J.) M-5/18/76. copies mailed.

Complaint

COUNT I.

(Directed to defendant David Kramer)

1. The plaintiff is a corporation incorporated under the laws of the State of Maryland and has its principal place of business in Beltsville, Maryland. Defendant David Kramer is a citizen of the State of Connecticut. Defendant The Advanced Products Company is a corporation incorporated under the laws of the State of Connecticut and has its principal place of business in North Haven, Connecticut. The matter in controversy exceeds the sum of $10,000, exclusive of interest and costs.

2. The plaintiff designs and manufactures metallic C and E seals, Vee flange ducting joints, and other pressure and vacuum devices, which operations require the extensive use by the plaintiff of its secret and confidential information and processes.

3. The defendant was employed by the plaintiff as its plant manager from October, 1971 until his discharge by plaintiff, on or about June 1, 1973.

4. Prior to being employed by the plaintiff, defendant Kramer had no knowledge of plaintiff's secret or confidential information, processes or production methods utilized by the plaintiff in the production of C-seals, among other things.

5. While employed by the plaintiff, defendant Kramer acquired numerous trade secrets and secret and confidential information of the plaintiff utilized, among other things, in the manufacture of C-seals, and relating to plaintiff's customer lists and other confidential customer information.

6. Subsequent to being discharged by the plaintiff, defendant Kramer has knowingly and willfully disclosed such trade secrets and confidential information of the plaintiff to the defendant The Advanced Products Company.

7. Such trade secrets and confidential information are a primary asset of the plaintiff, and plaintiff has guarded these trade secrets and confidential information carefully.

8. Defendant Kramer knew and knows that the plaintiff regarded such proprietary matter as trade secrets and confidential information.

9. By reason of defendant Kramer's willful and knowing disclosure of the plaintiff's trade secrets and confidential information, plaintiff has been, and unless defendant Kramer is enjoined from further such disclosures, will continue to be greatly and irreparably harmed and injured, and suffer the threat of loss of competitive advantage, income, profits and customers, without having an adequate remedy at law.

COUNT II.

(Directed to defendant The Advanced Products Company)

1. Paragraphs 1 and 2 of Count I are made Paragraphs 1 and 2 of this Count.

3. Defendant The Advanced Products Company is a competitor of the plaintiff, engaged in the design and production of flanges and seals for industrial and military applications.

4. Paragraphs 3 through 5 of Count I are made Paragraphs 4 through 6 of this Count.

7. Around September, 1973, defendant Kramer was employed by defendant The Advanced Products Company as a project engineer.

8. Shortly thereafter, defendant The Advanced Products Company began actively to solicit orders from some of the plaintiff's customers for C-seals.

9. Plaintiff's C-seals are produced by the use of secret information, processes and production methods, and the defendant Kramer was responsible for supervising the production of these items, among other things, while he was in the employ of the plaintiff.

10. Paragraphs 6 through 8 of Count I are made Paragraphs 10 through 12 of this Count.

13. Defendant The Advanced Products Company has appropriated and used, for its benefit, the confidential information and secrets of the plaintiff, including those relating to its production of C-seals, without plaintiff's consent, and in violation of its exclusive rights therein. Such appropriation and use by defendant The Advanced Products Company will be and has been of great value to said defendant, and will result, and has resulted, in the unjust enrichment of that defendant.

14. Plaintiff's competitive advantage in the development, manufacture and marketing of its products, including C-seals, will be seriously impaired, if not competely de-

stroyed, and plaintiff will therefore suffer great and irreparable loss, injury and damage without having an adequate remedy at law unless the unlawful invasion by defendant The Advanced Products Company of the plaintiff's rights in the aforesaid confidential information and secrets is enjoined.

* * * * *

Wherefore, the plaintiff claims:

1. A preliminary and permanent injunction:

a. preventing the defendant Kramer from using, divulging and communicating to others any of the plaintiff's confidential information and secrets, knowledge of which he obtained or acquired by reason of or during his employment by the plaintiff, Pressure Science Incorporated;

b. ordering defendant Kramer to return to the plaintiff all drawings, documents, and other tangible materials of the plaintiff obtained from the plaintiff, or from others, and any and all copies thereof; and

c. ordering defendant Kramer to deliver to the plaintiff all drawings, documents and other materials based on or utilizing any aspects of the confidential information and secrets of the plaintiff.

2. A preliminary and permanent injunction:

a. preventing the defendant The Advanced Products Company from eliciting, obtaining or acquiring from defendant Kramer any of the plaintiff's confidential information and secrets, knowledge of which defendant Kramer obtained or acquired by reason of or during his employment by the plaintiff, and from using or making use of any such confidential information and secrets;

b. ordering defendant The Advanced Products Company to return to the plaintiff all drawings, documents and other materials of the plaintiff obtained or received by The Advanced Products Company from the plaintiff, or from others, and any and all copies thereof; and

c. ordering defendant The Advanced Products Company to deliver to the plaintiff all drawings, documents and other materials based on or utilizing any aspects of the confidential information and secrets of the plaintiff.

3. An accounting against defendant The Advanced Products Company, and judgment for the amount found to be due on such accounting in favor of the plaintiff, for all profits realized by said defendant and for all damages and loss of profits ascertained to have been sustained by the plaintiff by reason of the unlawful conduct of the defendants.

* * * * *

5. Exemplary damages by reason of the willful and deliberate nature of defendants' actions, involving malicious injury or a reckless indifference to the interests of the plaintiff, said damages to include plaintiff's reasonable costs and expenses, including attorney's fees incurred in connection with the prosecution of this action.

6. Such further relief as equity requires.

* * * * *

Answer of Defendant Kramer

COUNT I

Defendant David Kramer for his answer to Count I of the complaint:

1. Admits the allegations contained in paragraphs 1 and 2, but denies that any secret or confidential information and processes are used by plaintiff in the manufacture of metallic C-seals.

2. Admits the allegations contained in paragraph 3 that defendant Kramer was employed and discharged by plaintiff, but denies the dates of employment therein alleged.

3. Denies the allegations contained in paragraphs 4 through 9.

* * * * *

Answer of Defendant Advanced Products

Defendant The Advanced Products Company ("A.P.C.") for its answer to Count II of the complaint:

1. Admits the allegations contained in paragraphs 1 and 2, except denies that any secret and confidential information and processes are used by plaintiff Pressure Science, Inc. ("P.S.I.") in the manufacture of metallic C-seals.

2. Admits the allegations contained in paragraph 3, except denies that it is engaged in the design and production of flanges.

3. Admits the allegations contained in paragraph 4.

4. Denies the allegations contained in paragraphs 5 and 6.

5. Denies the allegations contained in paragraph 7, except admits that defendant Kramer was employed by A.P.C. in June, 1973.

6. Denies the allegations contained in paragraph 8, except admits that it has actively solicited orders for C-seals.

7. Denies the allegations contained in paragraph 9, except admits that defendant Kramer was responsible for supervising the production of C-seals, among other things, while he was in the employ of P.S.I.

8. Denies the allegations contained in paragraphs 10, 11, 12, 13 and 14.

* * * * *

Memorandum of Decision

In this diversity action grounded primarily on a claim of misappropriation of trade secrets, the plaintiff, Pressure Science, Incorporated ("Pressure Science") seeks injunctive relief and damages against David Kramer, a former employee of Pressure Science, and Kramer's present employer, The Advanced Products Company ("Advanced Products").

The complaint contains three counts: two set forth causes of action for unfair competition against Kramer and Advanced Products and the third is based on a theory of unjust enrichment against Kramer alone. The defendants deny the material allegations of the complaint; and, in addition, Advanced Products seeks affirmative relief by way of two counterclaims: the first alleges violations of Sections 1 and 2 of the Sherman Anti-Trust Act, 15 U.S.C. §1 *et seq.*, and the second contends that the suit was instituted with the malicious intent of deterring Advanced Products from competing in business with Pressure Science.

In pretrial proceedings, the issues concerning damages, unjust enrichment, and the Sherman Act were severed pursuant to Rule 42(b). F. R. Civ. P. Accordingly, the questions at trial were limited to Pressure Science's unfair competition contentions and Advanced Products' cause of action for vexatious suit. After a careful review of the testimony and exhibits submitted at the trial, which extended over a month, and the comprehensive trial and post-trial briefs, the Court is of the opinion that the plaintiff failed to sustain its burden of proof on its claims of unfair competition and the defendant Advanced Products failed to sustain its burden of proof on its cause of action for malicious prosecution.

Memorandum of Decision

I. FINDINGS OF FACT

A. *The Parties*

1. The plaintiff, Pressure Science, is a Maryland corporation, with its principal place of business in Beltsville, Maryland.

2. The defendant, David Kramer, is a citizen of Connecticut.

3. The defendant, Advanced Products, is a corporation organized under the laws of the State of Connecticut, with its principal place of business in North Haven, Connecticut.

4. For almost 20 years, Pressure Science and its president, Dudley Taylor, have been engaged in the development, use and manufacture of metal seals, with particular emphasis on the manufacture of the metal seal which has a "C" configuration.

5. Taylor is a talented licensed professional engineer who devoted the major part of his business career to the development and manufacture of the C-seal. His modern machine shop employs 90 people, and his company has been regarded as the leading source for the manufacture and distribution of the C-seal.

6. Kramer, who held himself out as possessing high academic credentials, including a degree from the Massachusetts Institute of Technology and a master's degree in metallurgy from Columbia University, was hired by Pressure Science in November 1971.

7. Kramer became the production manager at Pressure Science at a salary of $25,000. During his employment, Kramer was involved in every aspect of the plaintiff's business on a daily basis and became familiar with the entire process by which Pressure Science manufactured C-seals.

8. On May 26, 1973, Kramer was released from his employment because Pressure Science was dissatisfied with his work and, in addition, the company learned he had misrepresented his background and academic credentials.

9. At no time during his employment at Pressure Science did Kramer execute a nondisclosure agreement concerning the company's manufacturing process.

10. Advanced Products was formed in 1954. Its chief executive officers are Harvey R. Sommer and Arthur Hostage. Sommer, a graduate of MIT, is an intelligent, progressive engineer who, along with Hostage, concentrated their company's efforts on the manufacture of metal seals or rings which have a configuration of an "O". Soon Advanced Products became one of the largest manufacturers of metal -O- rings in the world. It employs 60 persons and has gross sales of approximately one and one-half million dollars. It has an established reputation for competence as a metal seal manufacturer.

11. Following two interviews by officials of Advanced Products, Kramer was hired by Advanced Products as an engineer with a salary of $22,000 on June 1, 1973. He became the company's project engineer and was placed in charge of the manufacture of metal -C- rings.

12. In this lawsuit, Pressure Science alleges that, as a result of Advanced Products' employment of Kramer, Advanced Products unlawfully appropriated confidential information and trade secrets of Pressure Science, including those relating to Pressure Science's manufacture of the metal -C- ring or C-seal.

B. *The Metal Seal Business*

13. A metal seal is normally installed in the recess between two flanges in a piece of equipment in order to provide a leak-proof seal at the flange joint.

14. The use of metal seals has increased over the years with the development of machinery which requires sealing under environmental conditions exceeding the capabilities of organic seals. For example, rubber or other non-metallic materials often cannot withstand extreme temperatures, violent pressures, radioactivity and corrosion. Thus, metal seals are in great demand in the construction of aircraft, missiles and nuclear reactor vessels.

15. Metal seals are manufactured in a variety of configurations including an "O" shape, a "C" shape, an "E" shape and a "V" shape.

16. The O-seal was in popular demand in the 1960's. The process for the design and manufacture of the O-ring was widely known in the trade and both Pressure Science and Advanced Products, among other companies, had exact knowledge of its production, use and manufacture.

17. The manufacture of an O-seal consists of multiple steps, none of which is claimed to be proprietary or secret

by the parties. In general, the process consists of: a) coiling a piece of tubing of a common alloy into a circle on an arbor or a mandril whose size is approximately that of the finished product; b) placing the coil on a precise arbor for cutting; c) slicing the coil on a cut-off machine; d) welding the coil with a resistance butt welder after careful alignment; e) removing the weld upset which is the raised metal appearing around the diameter after welding; f) heat treating the ring; g) polishing, sand blasting or buffing if the ring is discolored by the heating procedure due to oxidation; h) again sizing the ring by the use of rollers; i) electroplating with silver, nickel, copper or other material according to specification; and j) packaging the ring in a plastic or urethane bag.

18. During the 1960's there was a selective but lucrative market for the seal with the "C" configuration. Several companies preferred the C-seal in the construction of aircraft engines and compressors and in low vacuum and radiation environments. Upon special request, Advanced Products produced the C-seal by machining away or cutting out a portion of the O-seal until the desired "C" configuration was achieved. However, this process was quite expensive and time consuming and constituted only a small part of Advanced Products' sales. The C-seal manufactured by Pressure Science was less costly to the customer and, as a result, Pressure Science controlled most of the C-seal business in the United States.

19. Pressure Science was able to produce a C-seal at a competitive price due to Taylor's research and experimentation. In 1956, Taylor originated the C-seal by machining

it from an O-seal. The machining process was expensive, difficult, and required highly skilled employees. He conceived the idea that a C-seal could be "formed" rather than machined. His first attempts at "forming" a C-seal by the use of a die were not successful. In the next several years, he tried to form a marketable C-seal by rubber press forming and a technique referred to as "curling". But these methods still proved expensive and other means to manufacture the C-seal were sought. In 1961, Taylor designed a four-piece die to form the C-seal; and, Taylor received his first large order for the seal to be used in a Navy modular hydraulics program. The four-piece die had several disadvantages including sharp edges, sensitivity to slug dimensions, variances from slug to slug, and high costs.

20. Finally, in 1965, Taylor developed a two-piece die to form the C-seal which is currently being used, with some modifications, by Pressure Science in its C-seal manufacturing process.

21. Pressure Science contends that its process for the manufacture of formed C-seals is a trade secret. The steps in the process claimed to be proprietary are essentially as follows:

a) Method of preparing the slugs or hoops to be formed into the "C" shape. One way to produce the hoop is to slit a metal strip and weld it; another is to purchase tubing from a tube redrawing mill which has suitable diameters and wall thickness. Inconel strip is the primary substance used for the hoops. Pressure Science's primary source for Inconel strip is the Pfizer Metal Company.

b) Method of welding the strip. Pressure Science utilizes tungsten inert gas, or TIG welding, in producing its C-seals. In welding the slug, it uses a welding fixture with shaped individual spring-loaded "fingers". After welding, the weld tabs are chiseled off the slug.

c) Method of weld mashing. "Mashing" the weld is the removal of projections in the vicinity of the tabs by a belt sander. Pressure Science employs shaped, as opposed to flat, tool bits "to perform this operation."

d) Method of preforming the slug by roll forming. Pressure Science uses a male and a female roller device to slightly roll the hoops in order to produce a better "C" shape and to exert less wear on the forming tools.

e) Method of obtaining the final "C" shape. Approximately 95% of Pressure Science's C-seals are formed by a two-piece die; the remaining 5% are shaped by rollers. The two-piece die consists of a matching top and bottom half with half the "C" cut into the cavity of each piece. The two halves are aligned by a center pin. The die contains die stops and the inner surface of the slug is unsupported during the forming process. The dies are designed in Pressure Science's plant and are made of a tool steel known as Graph-air. Each die costs about $60. Pressure Science has the capability to die-form seals up to 20″ diameter; for larger seals, the forming is by use of rollers. However, roll forming is a well-known technique and is fully disclosed in the relevant literature.

f) Method for "pulsing" the C-seal for sizing and relieving residual stresses in the metal.

g) Method of heat treating the C-seal to enhance the seal properties.

h) Method of polishing the C-seal by the use of polishing pots. The purpose of polishing is to improve the surface finish and to give the seal a circular lay.

i) Method of electroplating the C-seal. In some applications, plating racks are used while the C-seals are electroplated with indium, silver or some other soft metal to seal leakage paths. Pressure Science's racks have spring clips that fit inside the "C" cross section and hold the seal in place during plating.

j) Method of packaging the C-seals.

22. Pressure Science's C-seal production procedures have never been patented.

23. Tours of the Pressure Science plant were conducted by supervisory personnel while the plant was in operation and the production processes were open to view. However, as a general rule, visitors could not obtain a detailed view of the procedures employed by Pressure Science to make C-seals.

24. Drawing of flanges and couplings containing dimensions sent by Pressure Science to its customers were imprinted with a legend indicating that the information was proprietary to Pressure Science.

25. Drawings of C-seals sent by Pressure Science to its customers did not contain a proprietary legend.

26. While Pressure Science's advertisements for flanges, seals, and couplings stated that they were made to "proprietary company designs," the advertisements for C-seals

only refer to them as being made by "Taylor's exclusive economical process" and having "Taylor's exclusive curved seal line." The design of the C-seal is not claimed to be proprietary.

27. In 1970, Pressure Science drafted an employee contract which related to the non-disclosure of the company's patents, inventions, proprietary information and related matters.

28. The employee agreement was executed by Taylor and other Pressure Science officials but not by Kramer.

29. Pressure Science had no routine procedure for informing employees of any proprietary processes until 1974.

30. Robert N. Russell, Jr., a credible witness, was a former employee of Pressure Science who left the company in 1973 on amicable terms to resume his education at the University of Maryland. He testified that he worked as a production expeditor and had daily contact with all the steps used in the manufacture of C-seals. He understood the basic elements of the C-seal production process and knew the identity of all of the company's supplies.

At no time was Russell required to sign a nondisclosure agreement or advised that the C-seal manufacturing techniques were confidential and should not be disclosed. Moreover, he was not aware that any officials of Pressure Science had informed the company's employees that the production of C-seals was to be regarded as proprietary to the company.

31. In 1972, it became evident to Advanced Products that the demand for C-seals was increasing and that its

O-ring business was being seriously eroded because large companies, such as Pratt & Whitney, were purchasing C-seals from Pressure Science rather than O-rings from Advanced Products. Sommer further recognized that his company could not profitably manufacture C-rings from finished O-rings on a large volume basis because of the high cost of tubing and other expenses associated with the production of O-rings.

32. By early 1973, Advanced Products' officials and engineers were actively engaged in discussions concerning various methods of producing C-seals by means other than machining them from O-rings. The discussions included rubber press forming, die forming and roll forming. Bernard Sniegowski, Advanced Products' project engineer and quality control manager, was assigned the task of recommending practical and inexpensive methods to manufacture C-seals. Sniegowski was a capable mechanical engineer with long experience in the metal seals and rings field. Among other things, he was quite familiar with metal forming practices.

33. On May 15, 1973, Sniegowski submitted a memorandum to Sommer entitled "General Comments on 'C' Seal Forming Methods." The memorandum discusses various methods and mentions "straight matched metal die forming," "rubber press forming," "mechanical compression between flats," and "a metal die set split but ½ C top and bottom." Sniegowski further stated that he had prepared "a completed plan to start with rubber press forming."

34. Sommer took no action on the Sniegowski memo and relieved Sniegowski of primary responsibility for the com-

pany's new ventures into the C-seal business for three basic reasons: a) Sniegowski was heavily committed to other duties in the plant; b) Sommer was disenchanted with Sniegowski's preference for rubber press forming; and c) Kramer had come on the scene seeking employment with Advanced Products.

35. Although there had been over 100% turnover in Pressure Science's employees during the period 1970-1973, Advanced Products made no overtures to former employees of Pressure Science to join the staff at Advanced Products.

36. Kramer first contacted Sommer around the middle of May 1973, identifying himself as the production manager for Pressure Science and indicating that he was interested in new employment. Kramer was invited to visit Advanced Products for a job interview on May 22.

37. At the May 22 interview Kramer generally discussed his responsibilities and duties at Pressure Science. He explained that he had personality conflicts with certain of the officials at Pressure Science and that the company would not permit him to pursue certain suggestions he had made to management. He further indicated his salary was $26,000.

38. Obviously Kramer's availability for employment was extremely attractive to Advanced Products because of his experience in the manufacture of C-seals and the likelihood that he would be able to supervise the production of the seals either at Advanced Products' plant in Connecticut or at a new location acquired for that purpose.

39. Despite this, Kramer was not offered employment nor was anything said to induce Kramer to leave his job at Pressure Science.

40. Shortly after the May 22 interview, Kramer telephoned Sommer and expressed again his interest in being hired by Advanced Products. Another interview was arranged for June 1. At this time, Sommer was not aware that Kramer was unemployed.

41. Following the June 1 interview, Advanced Products made an offer of employment to Kramer at a salary of $22,000 and Kramer accepted. In 1973, Kramer received the lowest annual bonus paid to employees at Advanced Products ($200) and in 1974, he received no annual bonus.

42. Kramer reported to work on June 18, 1973. In the fall of 1973 Advanced Products began to manufacture formed C-rings. Sales for 1973 were $3,300; $33,000 in 1974 and approximately $66,000 in 1975.

43. Advanced Products utilizes most of the same general overall concepts in manufacturing its C-rings as Pressure Science does in producing its C-seals. However, almost every step in the production of C-seals was known or used in the manufacture of other and similar products; in addition, there are certain significant differences between the procedures employed by the two companies.

44. This Court, accompanied by counsel and their clients, personally inspected the Advanced Products' plant while it was in operation.

45. Advanced Products uses Inconel for its slugs and bands, as does Pressure Science. The properties of Inconel are well known in the metal seal business and Advanced Products in the late 1960's made large diameter O-rings from Inconel 718. A major supplier of Inconel, Pfizer Metals Company, is located in the same industrial park as Advanced Products and Sommer and others at Advanced Products were familiar with Pfizer's product line.

46. The art of TIG welding is common knowledge in the metal trade. Advanced Products, for many years, TIG welded its large O-rings with a welder designed and built by Sommer in 1962. In welding the C-seal slug, Advanced Products uses a solid bar hold-down fixture while Pressure Science employs shaped individual spring-loaded fingers. In welding, the necessity for a hold-down fixture is obvious and the fixtures used by Advanced Products and Pressure Science are distinctly different. The Advanced Products' fixture has a fixed mandril and two solid bars to clamp the strip and tabs during welding. The two bars are composed of separate segments to permit replacement of single components as opposed to an entire bar when uneven wear occurs. The segments are straight and not shaped. A bolt passes through the separate segments of each hold-down bar. The segments do not move independently of each other. The solid hold-down fixture is widely used in the industry as are separate starting and stopping tabs to avoid end craters.

47. Advanced Products does not use a welding fixture featuring shaped spring-loaded fingers in any way similar to Pressure Science's. In any event, the design features of Pressure Science's fixture are found in the advertising lit-

erature of welding fixture manufacturers and are available in fixtures which can be used to weld strip similar in size to that welded by Pressure Science and Advanced Products.

48. To remove the projections in the vicinity of the tabs, Advanced Products applies a metal working technique known as "planishing". Weld planishing is disclosed in the industry's literature and is used widely throughout the metal working industry. After the weld upset is planished, a belt sander, built by Advanced Products ten years ago, is applied to the edges of the weld zone to ensure their smoothness.

49. Advanced Products very seldom preforms the slugs or hoops prior to entry into the die; Pressure Science almost always performs the hoop. In any event, the concept of preforming and its advantages were recognized by Sommer and Sniegowski prior to May 1973, and preforming was mentioned and depicted in the Sniegowski memorandum submitted on May 15, 1973, to Sommer. In the few instances that Advanced Products does preform, it utilizes standard rolling techniques on a milling machine purchased 15 years ago.

50. Advanced Products uses a split metal die, as does Pressure Science, to form its small to medium sized C-rings. The metal die is aligned with a single center dowel pin and half the "C" shape is cut into the top half of the die and half the "C" shape is cut into the bottom half of the die.

51. Prior to May 15, 1973, Sommer and Sniegowski were well aware of the concept that a split metal die could be

used to form small to medium diameter internal and external C-rings.

52. Prior to May 15, 1973, Sommer concluded that the preferred way to produce small to medium diameter internal and external C-rings was to use a split metal die with half the "C" shape in the top and half the "C" shape in the bottom.

53. Prior to May 15, 1976 [*semble* 1973], Sniegowski possessed the knowledge and experience to implement the manufacture of C-rings by utilizing a split die.

54. Without Kramer's guidance and advice, Advanced Products could have produced formed C-rings on a production basis within nine months after May 15, 1973.

55. The two expert witnesses, Edward A. Barton and George Merwin, called by Advanced Products to testify at the trial, are both highly skilled specialists in the tool and die business. The Court gives full credence to the testimony of these well-qualified, impartial witnesses.

56. Barton is president of the J. C. Barton Company, the largest tool and die company in Connecticut. The company specializes in the design and manufacture of special tools and dies and, over the years, it has designed and made dies ranging from simple two-piece dies for $150 to $200 to expensive progressive dies for $25,000. Barton has been actively engaged in the tool and die business for over thirty-five years and is a specialist in die design work.

Merwin is the founder and former president of Aladdin Tool & Die Company ("Aladdin"), a large tool and die company in Connecticut that specializes in precision tool and die work. Most of Aladdin's work involves the design and manufacture of dies to form small parts where the tolerances are one-thousandths of an inch. Merwin headed Aladdin for over 25 years and, during that time, he was actively engaged in die design.

57. Both independent experts explained that the die-forming techniques used by Pressure Science and Advanced Products are well known and commonly used techniques in the tool and die industry. Both men had extensive prior experiences with split dies, with unsupported forming, and the use of stops to control the flow of metal in a die cavity.

58. While Barton and Merwin never made a die to form a C-seal, each of their respective companies, upon request, could have designed and made such a die within a matter of a few months. They would have used an air-hardened tool steel and the die would have been split because there has to be a way to separate the die and remove the part. Since the part to be formed was round, the die would have been round; and, it would have been aligned by a single center pin, since that is the simplest way to align two concentric halves. Further, in order to form the hoop into the desired C shape, the interior cavity of the die obviously would have had a C cross-sectional shape cut into it. Lastly, the shape of the finished part (a ring with a "C" shaped opening) would have made it apparent that there had to be a stop in the die cavity in order to maintain the desired cross-sectional opening.

59. Barton testified that he would have given a $1500 to $2000 quotation on the first die and considerably lower quo-

tations on subsequent dies. Barton thought he could eventually make metal-C-ring dies for $100. Merwin testified that he would have given $1000 to $1200 quotation on the first die and that he could eventually sell the dies for $200 to $300, and possibly lower.

60. There is nothing novel, secret or unique about the split metal die employed by Pressure Science and Advanced Products to form internal and external metal C-seals.

61. Advanced Products does not "pulse" its C-rings in order to relieve residual stress.

62. In sizing the free height of a C-ring, Advanced Products confines the ring between a retainer plate and top plate and then strikes the ring in a press once or twice. Advanced Products has been using this same technique to size its O-rings for over 16 years.

63. Advanced Products heat treats its C-rings in the same manner it heat treated its O-rings and machined C-rings for many years prior to May 1973.

64. There is nothing unique or novel about Pressure Science's or Advanced Products' use of polishing pots. Almost identical devices were being used by other metal seal manufacturers prior to May 1973. For example, in 1968, expanding aluminum chucks or pots were used by D.S.D. Magnatech in the production of the Servo-Flex seal.

65. Advanced Products' method of electroplating the C-ring, when necessary, involves the use of plating racks which are commercially available and, prior to May 1973, widely used throughout the industry.

66. Advanced Products uses the same material to package C-rings that it used for at least five years to package its O-rings.

67. Kramer's knowledge of and experience in the C-seal business proved beneficial to Advanced Products; his employment enabled the company to gain a "lead time" of several months in penetrating the C-seal business on a production basis. However, Kramer did not reveal or utilize any trade secrets belonging to Pressure Science during the course of his employment with Advanced Products.

68. None of the materials, sources of materials, devices, concepts, or methods used by Pressure Science in the manufacture of C-seals was a trade secret.

69. The totality of all the materials, sources of materials, devices, concepts, or procedures in the ten principal steps used by Pressure Science in the production of C-seals was known by others or used by others in the metal trade business and tie [*sic*] and die industry, and was not, therefore, a trade secret of Pressure Science.

70. There is no credible evidence in the record that Pressure Science instituted the present action with an improper motive or for the purpose of keeping Advanced Products out of the C-ring business.

II. Conclusions of Law

1. This Court has jurisdiction of the subject matter and of the parties: the amount in controversy exceeds $10,000, exclusive of interest and costs. 28 U.S.C. §1332.

2. Pressure Science's process for the manufacture of formed metallic C-seals is not a trade secret.

3. Kramer was free to use his knowledge of and experience in the manufacture of C-seals during his employment with Advanced Products.

4. Advanced Products did not misappropriate or use for its own purposes any of Pressure Science's trade secrets for the production of C-seals.

5. Judgment may enter on the complaint in favor of the defendants and against the plaintiff.

6. Judgment may enter on the counterclaim in favor of the plaintiff and against the defendant, Advanced Products.

III. Discussion

There is no dispute that in this diversity action the law of Connecticut applies and governs the substantive issues. *Franke* v. *Wiltschek,* 209 F. 2d 493, 494 (2 Cir. 1953); *Sperry Rand Corporation* v. *Rothlein,* 241 F. Supp. 549, 559 (D. Conn. 1964).

The threshold issue in this case is whether a trade secret exists which is to be protected. *Plastic & Metal Fabricators, Inc.* v. *Roy,* 163 Conn. 257, 267 (1972); see also 2 R. Callman, *The Law of Unfair Competition, Trademarks and Monopolies,* §51.1 at 348 (1968). Connecticut, as have a number of states, has adopted the definition of a trade secret which is set forth in the Restatement, 4 Torts §757, comment b. *Town & Country House & Homes Service, Inc.*

v. *Evans,* 150 Conn. 314, 318 (1963); *Allen Mfg. Co.* v. *Loika,* 145 Conn. 509, 516 (1958). The provision reads as follows:

> A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. It may be a formula for a chemical compound, a process of manufacturing, treating or preserving materials, a pattern for a machine or other device, or a list of customers . . . a trade secret is a process or device for continuous use in the operation of the business.

Some of the factors to be considered in determining whether given information is a trade secret are:

(1) the extent to which the information is known outside the business;

(2) the extent to which it is known by employees and others involved in the business;

(3) the extent of measures taken by the employer to guard the secrecy of the information;

(4) the value of the information to the employer and his competitors;

(5) the amount of effort or money expended by the employer in developing the information;

(6) the ease or difficulty with which the information could be properly acquired or duplicated by others.

Restatement, 4 Torts §575, comment b, quoted with approval in *Town & Country House & Homes Service, Inc.* v. *Evans,* supra at 319. See also *Wilson Certified Foods, Inc.* v. *Fairbury Food Prod., Inc.,* 370 F. Supp. 1081, 1083 (D. Neb. 1974).

(A) *The Extent to Which The Information Is Known Outside The Business*

Pressure Science advances broad claims that the procedures it uses in the production of C-seals are trade secrets. The weight of the evidence at trial, however, was to the contrary.

At the outset, it is appropriate to note that it seems evident Taylor and his associates honestly believed that their manufacturing methods were unique and secret. Perhaps their deep involvement in their own work insulated them from knowledge of and exposure to the rapid advancements in production techniques for metal seals that were occurring in other parts of the country. It appears that, until this trial, they rested assured, in the relatively secluded environment of their plant, that their processes were unknown to others and proprietary to them.

However, there is nothing esoteric or complex about the manufacturing equipment and techniques employed to make C-seals. As the findings of fact indicate, almost all of the methods used by Pressure Science were for many years utilized by or were known concepts to companies in the industry, including Advanced Products. At trial, Pressure Science adopted a position that the entire C-seal manufacturing process was a trade secret. Such a claim, particularly as it pertained to sources of supplies, use of a die to form the seal, welding the hoops, polishing, heat treating, electroplating and packaging, was clearly not established. Since the plaintiff's sincerity is not doubted, the Court must attribute these contentions to zeal and misinformation.

While it is true that prior to 1973, no company, other than Pressure Science made C-seals by die forming, this fact, in and of itself, is not sufficient to tip the scales in plaintiff's favor. The die has a very simple and basic design; and, as one of Pressure Science's key witnesses testified, it could be reproduced "in a minute" by an experienced engineer who viewed it opened. Two independent, impartial experts, Barton and Merwin, gave convincing testimony that their companies, upon request, could have easily designed and produced a die similar to Pressure Science's. Both men had extensive prior experience with the use of stops in a die cavity and with dies in which part of the finished image was cut into each half of the die and the two matching halves were aligned by a center dowel pin. In addition, Advanced Products had the in-house personnel and capabilities to design and make a split die to manufacture C-seals. Cf. *Shatterproof Glass Co.* v. *Guardian Glass Co.,* 322 F. Supp. 854, 868 (E.D. Mich. 1970). Prior to Kramer's employment, Sommer and Sniegowski had discussed and considered various forming methods, some of them identical to Taylor's early experiments, and had the split metal die technique on the drawing boards. Having worked extensively with the Servo-Flex seals, V-seals and roll formed C-seals, Sniegowski was familiar with all the procedures in welding twin Inconel strip and forming seals. In addition, the arts of polishing, heating, electroplating and TIG welding metal seals were known to them as well as to most scientists and engineers in the same and related businesses.

(B) *The Extent to Which the Process Is Known by Employees of the Plaintiff and by Other Persons In the Plaintiff's Business*

In the early 1960's, Taylor worked with one paid employee and several part-time machinists to produce C-seals. By 1968, Taylor employed approximately 20 persons and had hired Bernard Sadoff, a graduate engineer; by 1975, Pressure Science had 90 employees. Continued C-seal production growth is anticipated by the company. It is unclear exactly how many of Pressure Science's employees became familiar with the C-seal manufacturing process, but it must be assumed that, in addition to Taylor, Sadoff, and Kramer, most of the employees could easily become acquainted with every step in the process. Despite the extraordinary turnover rate of 380 employees over the years, none was required to sign a nondisclosure agreement when hired. Compare *Sperry Rand Corporation* v. *Rothlein,* supra, 241 F. Supp. at 554. There was little or no evidence that most of the employees possessed special skills nor did the company appear to restrict knowledge of the C-seal manufacturing procedures to designated employees. Cf. *Wilson Certified Foods, Inc.* v. *Fairbury Food Prod., Inc.,* supra, 370 F. Supp. at 1085; *Future Plastics, Inc.* v. *Ware Shoals Plastics, Inc.,* 340 F. Supp. 1376, 1380-1381 (D.S.C. 1972).

(C) *The Extent of the Measures Taken by the Plaintiff to Guard the Secrecy of the Process*

Prior to June 1973, the rear portion of Pressure Science's plant was allocated to C-seal manufacture. Until recently two large sliding glass windows were located along the rear wall of the area which provided an uninterrupted view of the manufacturing process. In June 1973, these windows were removed. The die used to form the C-seals is made in Pressure Science's machine shop which is not located in the C-seal manufacturing area proper. The plant does not have a watchman but does have an alarm system which rings in the local police department.

Visitors were not permitted in the Pressure Science production area without an escort. Tours, however, were given of Pressure Science manufacturing facilities, including the C-seal area. During these tours, the plant was in operation and the use of a die in the forming of the C-seal was clearly visible to the observer. Some of the visitors possessed the knowledge and skill to duplicate the manufacturing process observed during these tours.

Although at the time Kramer was hired Pressure Science required nondisclosure agreements to be signed by some of its employees, Kramer was not asked to sign such an agreement. Moreover, there was no written procedure at Pressure Science that set forth a policy or practice of advising its employees that the company considered its C-seal process confidential or that the process should not be disclosed. Compare *Sperry Rand Corporation* v. *Rothlein,* supra, 241 F. Supp. at 555.

In view of the above, and in the light of the testimony of witnesses such as Robert Russell, it appears that Pressure Science did not make significant efforts to maintain the secrecy of its C-seal manufacturing process or to guard against disclosure of that process to its competitors.

(D) *The Value of the Information to the Plaintiff and to Its Competitors*

There is little question that Taylor is a dedicated, talented scientist and engineer. In the late 1960's, he realized that a metal seal in the shape of a "C" had distinct performance advantages over a metal seal with the configuration of an "O". He further recognized that making a C-seal by machining it from an O-seal was expensive and difficult. After much research, effort, and experimentation with various dies, he designed by 1965 a two-piece die to manufacture formed C-seals which were economically attractive to the market.

It is crucial to note, however, that at this time the demand for C-seals was minimal; and therefore, their production was of little interest to the metal seal industry in general. When other companies, such as Advanced Products, received an occasional order for small quantities of C-seals, the seals were machined from O-seals to satisfy the customer. Thus, Advanced Products had little interest in penetrating the relatively small market for C-seals and, in effect, was content to leave the field solely to Pressure Science.

In the early 1970's, the owners of Advanced Products, the largest manufacturer of O-rings in the world, noticed that the demand for C-seals was increasing and that C-seals were displacing O-rings in certain applications, particularly in the aircraft industry. It was apparent to Advanced Products that it could not profitably mass produce C-seals from finished O-rings because of the high unit cost associated with that method of manufacture. Naturally, Advanced Products considered alternate methods of manufacture; and, since it was common knowledge in the business that certain seals could be formed inexpensively by a die, it contemplated the utilization of a split match metal die with half the "C" cut into the top and half the "C" cut into the bottom. Once Advanced Products decided to compete in the accelerating C-seal market, it could have, without Kramer, produced formed C-seals in competition with Pressure Science.

In certain applications the C-seal has distinct performance advantages over metal seals in other configurations, and the most economical and feasible methods to manufacture C-seals are by the procedures utilized by both parties. The growing demand for these seals will enable each of the parties to enjoy an active and profitable business and, at the same time, the market will gain the benefits resulting from free and open competition. Since the evidence disclosed that the plaintiff failed to establish any special proc[illegible] combination of procedures so superior or so disting[illegible]able as to warrant trade secret classification, the Court concludes that the value of the particular methods used by Pressure Science to produce C-seals is not significant.

(E) *The Amount of Effort or Money Expended by the Plaintiff to Develop Its Process*

Taylor, for the most part working alone in the early years, did expend a great deal of effort and several thousand dollars to put together the procedures which produced a formed C-seal. But this fact cannot convert known concepts into trade secrets. Actually the time, money and effort invested in the business does not appear to be singular considering Taylor's initial part-time commitment to the project and his rather meager capitalization. Well-staffed and well-financed companies, such as Advanced Products, would have been able to produce formed C-seals on a production basis in a much shorter time than Pressure Science. In addition, most equipment and procedures for the manufacture of the formed C-seal were already in-house at Advanced Products as part of its large O-ring and other business methods.

(F) *The Ease or Difficulty With Which the Process Could Be Properly Acquired or Duplicated*

As the findings of fact reveal, almost all of the procedures utilized to manufacture the C-seal were being used by Advanced Products in its O-ring business. Prior to May 1973, Advanced Products produced the desired "C" shape by machining or cutting out an O-ring. Thereafter, it heat treated, sized, stretched-formed, electroplated, polished and packaged the C-seal. When it decided to mass produce the C-seal, its engineers recognized that the desired "C" shape had to be formed rather than cut out from an O-ring. At that time, it had available the in-house expertise and equipment to accomplish its goal. Kramer's arrival on the scene expedited what was already a foregone conclusion and gave Advanced Products a needed project engineer and supervisor for that aspect of its business.

Kramer, by using his expertise to organize and supervise the effort, merely hastened Advanced Products' entry into the C-seal market on a production basis. To deny Kramer "the right to practice his trade by attempting to establish the general experience and knowledge of the employer as a trade secret when actually [Kramer's] knowledge and experience in his trade is a substantial contribution to this general process is not the type of situation within the contemplation of the law guarding the disclosure of trade secrets." *Cudahy Company* v. *American Laboratories, Inc.*, 313 F. Supp. 1339, 1345 (D. Neb. 1970); see also *E. W. Bliss Company* v. *Struthers-Dunn, Inc.*, 408 F. 2d 1103 (8 Cir. 1969). Under these circumstances, Kramer was entitled to seek employment immediately and freely with one of his former employer's competitors. Cf. *Republic Sys. & Program., Inc.* v. *Computer Assist. Inc.*, 322 F. Supp. 619, 627 (D. Conn. 1970).

In addition, the literature on the subject and the availability of experienced tool and die makers, such as Barton and Merwin, provided additional avenues for Advanced Products to explore and readily obtain the necessary two-piece die to form the C-ring within a matter of a few months.

Finally, it is appropriate to comment on the procedure to form large C-seals where a die would not be practical. Pressure Science die-forms C-seals up to 20 inches in diameter; for larger seals, it uses roll forming. On the other hand, Advanced Products roll forms its C-rings if the diameter is 14 inches or larger. The evidence was clear that roll forming is a well known technique in the trade and that Advanced Products roll forms its C-rings on the roll formers, with some slight modifications, it used for many years in its O-ring manufacturing procedures.

Having considered the factors enumerated above, the Court must conclude that the plaintiff has failed to carry its burden of establishing that its production process techniques for C-seals are trade secrets. Cf. *Keystone Plastics, Inc.* v. *C & P Plastics, Inc.,* 340 F. Supp. 55, 61 (S.D. Fla. 1972), aff'd 506 F. 2d 960 (5 Cir. 1975); *Sperry Rand Corporation* v. *Pentronix, Inc.,* 311 F. Supp. 910, 912 (E.D. Pa. 1970); see also *Ferranti Electric, Inc.* v. *Harwood,* 43 Misc. 533, 251 N.Y.S. 2d 612 (1964).

IV. CONCLUSION

In summary, therefore, it is the Court's considered opinion that (1) Pressure Science does not possess a body of confidential and proprietary information with respect to its C-seal manufacturing process; (2) Advanced Products did not wrongfully appropriate, for its benefit, any trade secrets of Pressure Science with respect to the production of C-seals; and (3) Kramer did not breach his duties of loyalty and fidelity to Pressure Science. The Court further concludes that Advanced Products failed to carry its burden of proof on its counterclaim grounded on a theory of malicious prosecution or vexatious suit.

Accordingly, it is ordered that judgment is entered on the complaint for the defendants and judgment is entered on the counterclaim for the plaintiff.

Dated at New Haven, Connecticut, this 15th day of April, 1976.

/s/ ROBERT C. ZAMPANO
United States District Judge

Judgment

This action came on for trial before the Court, Honorable Robert C. Zampano, United States District Judge, presiding, and the issues having been duly tried and a decision having been duly rendered, under date of April 15, 1976,

It is Ordered and Adjudged:

(1) That judgment be and is hereby entered in favor of the defendants dismissing the complaint; and

(2) That judgment be and is hereby entered in favor of the plaintiff dismissing the counterclaim.

* * * * *

Dated at New Haven, Connecticut, this 19th day of April, 1976.

Excerpts From Defendant Advanced Products' Pre-Trial Memorandum, March 1, 1974

[18] VIII. EXPERT WITNESSES

* * * * *

1. Edward Barton

Barton is President of the J. C. Barton Co. in East Hampton, Connecticut, one of the largest tool and die companies in Connecticut. Barton will testify about the general availability of various metal forming techniques with emphasis on match metal dies.

[19] 2. George Merwin

Merwin is the former owner of Aladdin Tool & Die Company, Inc., North Haven, Connecticut. Merwin's testimony will relate to the general availability of various metal forming techniques, including match metal dies.

Excerpts From Plaintiff's Requests for Admission to Defendant Kramer and Responses Thereto

* * * * *

47. In 1968, Raytheon Company brought suit against Kramer for conversion of certain of its proprietary items.

47. Admitted.

* * * * *

51. The document attached to this request as Exhibit C is a genuine copy of the agreement signed by defendant Kramer on September 26, 1968.

51. Admitted.

AGREEMENT, EXHIBIT C TO REQUEST FOR ADMISSION 51

AGREEMENT

This Agreement, executed by and between David H. Kramer, sometimes known as David Kramer, now of Burroughs Road, Boxborough, Massachusetts, and Raytheon Company, a Delaware Corporation, having a usual place of business in Lexington, Massachusetts, on the 26th day of September, 1968;

WHEREAS, David H. Kramer represents that he had prior to this date in his possession a copy of a proprietary Raytheon proposal entitled "A Study of the Reliability of Plated Wire Computer Components", which constitutes a trade secret to Raytheon Company, which he left with General Precision Systems Inc. in California in August, 1968; and

WHEREAS, David H. Kramer represents that he now has in his possession the following items which are proprietary and constitute trade secrets to the Raytheon Company:

1. Photographs of the Raytheon plated wire facility and manufacturing process,
2. Two plated wire memory planes, and
3. Blueprints and drawings of the Raytheon plated wire facility including part of the manufacturing processes; and

WHEREAS, Raytheon Company has instituted a civil action against the said David H. Kramer for the purposes of acquiring the above noted items and for other purposes.

NOW, THEREFORE, in consideration of the mutual covenants and premises contained herein, the parties agree as follows:

1. Upon the execution of this Agreement David H. Kramer will transfer possession of the three above mentioned

items and any other Raytheon property and all copies thereof which David H. Kramer has in his possession to the Raytheon Company.

2. David H. Kramer will not disclose any information contained in or revealed by the aforementioned items including the aforementioned proposal or any other proprietary information of Raytheon to any third party nor will David H. Kramer use any said information for any purposes whatsoever without the written consent of a duly authorized representative of Raytheon Company.

3. Raytheon Company will file a non-suit in the aforementioned civil suit without prejudice.

IN WITNESS WHEREOF, the parties hereto set their hand and seal on the date above written.

David H Kramer
DAVID H. KRAMER

Raytheon Company
RAYTHEON COMPANY

By Robert G. Hennemuth

Excerpts From Findings of Fact Agreed to by All Parties

* * * * *

Agreed Findings Proposed by Plaintiff

28. Very little metal working is done in the area. There are no metal seal companies at all in the Beltsville area. (T. at 76.)

* * * * *

43. Pressure Science frequently sends out C-seal drawings to customers. (T. at 110.) However, such drawings do not contain any information considered proprietary to Pressure Science. (T. at 113. See PX 13.)

44. Pressure Science does have occasion to send out drawings to customers containing proprietary information. Such drawings relate to flanges and couplings manufactured by Pressure Science, and the drawings are imprinted with proprietary legends which warn users that information on the drawings is proprietary to Pressure Science. (T. at 113-116, 374-75. PX 14 and 14A.)

* * * * *

135. With respect to the C-seal die, Pressure Science claims in this litigation the following aspects as proprietary: having a portion of the seal shape cut in the top part of the die and part cut in the bottom portion of the die; the use of a center pin for alignment of the die halves; the fact that the inner surface of the slug being formed is unsupported during forming; and the use of die stops. (T. at 453.)

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Excerpts From Findings of Fact Agreed to by All Parties

148. Taylor began work in 1958-59 in the basement of his home, with no paid employees. (T. at 669.)

* * * * *

157. By 1960, Taylor had moved his operation to a three car garage in Beltsville, Maryland, and had hired one employee. (T. at 700-701.)

* * * * *

204. While at Pressure Science, Kramer was aware that something an employer claimed as proprietary could not be disclosed by an employee without authorization. (T. at 1065-66.)

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206. At the time Kramer left Pressure Science, he was not aware of any other seal manufacturer which was using a process similar to Pressure Science's for producing C-seals. (T. at 1069.)

* * * * *

230. For a period of seventeen months after his employment at The Advanced Products Company, Kramer supervised production of C-seals. (T. at 1127.)

231. David Kramer never saw the Sniegowski memo (APX R) until December, 1973. (T. at 1128.)

232. Kramer knows of no other company than Advanced Products which uses a C-seal manufacturing process similar to the one used by Pressure Science. (T. at 1128.) The Advanced Products Company is now using a precision metal forming process to produce C-seals similar to the one used by Pressure Science to make its C-seals. (T. at 1129.)

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Excerpts From Findings of Fact Agreed to by All Parties

235. Kramer was the first employee devoted full-time to the C-seal business at The Advanced Products Company. (T. at 1141.)

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241. Prior to Kramer's employment with Advanced Products, the company had not made any C-seals by forming. (T. at 1185-86.)

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251. At the meeting of May 22, Kramer told Sommer that he knew the complete process of everything Pressure Science made. (T. at 1198-99.)

* * * * * *

254. Prior to offering Kramer employment, Advanced Products did not check Kramer's background or check with Pressure Science about his performance there or the circumstances of his leaving. (T. at 1204.)

* * * * * *

256. Advanced Products made its first formed C-seal in September, 1973. (T. at 1208.) Kramer was hired to be in charge of manufacturing C-seals for The Advanced Products Company. (T. at 1208.)

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263. In the early '60s, Advanced Products attempted to buy Pressure Science (then known as High Pressure Engineers). Advanced Products was interested in buying Pressure Science because of its C-seal. (T. at 1225-26.)

264. In addition to the "C-ring", Advanced Products currently manufactures the metal O-ring, the clam seal and the lo-load seal at its plant. With the exception of the "C-ring", none of these seals is die formed. (T. at 1227.)

Excerpts From Findings of Fact Agreed to by All Parties

265. The first formed C-seal that was produced at Advanced Products was done under Kramer's direction. (T. at 1227.)

* * * * *

275. Sommer is not aware of any other company in the United States making C-seals by a process similar to the one used at Pressure Science and at The Advanced Products Company. (T. at 1256.)

* * * * *

311. Sniegowski wrote his memorandum on C-seal forming as a means of formally listing all methods and techniques which Advanced Products personnel had been discussing prior to the hiring of David Kramer. The various forming concepts discussed in the memo were not intended to indicate any priority or preference. (Tr. at 1719-21.)

* * * * *

335. Prior to this litigation, Barton was not familiar with the term "matched metal die". (T. at 2285.)

336. Barton had never been requested by a customer to design a C-seal type die. (T. at 2286.) Barton has never attempted to design any die for a static metallic seal. (T. at 2287.)

* * * * *

342. Merwin was not familiar with the term "matched metal die". (T. at 2365.)

* * * * *

345. Merwin has never made a C-seal die, nor was he ever approached by anyone who asked him to design such a die. (T. at 2377.)

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Excerpts From Findings of Fact Agreed to by All Parties

Agreed Findings Proposed by Defendant Advanced Products

7. At the time of Kramer's hiring, A.P.C. was engaged in the manufacture of special metal seals in the United States and Europe.

Sommer pp. 1294-1298.

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10. The metal-C-ring is a special metal seal which typically is in the form of a ring with a C-shaped cross section.

Sadoff p. 30; Exhibit O.

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12. There are two basic classes of special metal seals: the crush type and the resilient seal. Both classes of metal seals are manufactured in many different configurations, metal alloys, coatings and platings. Selection of the class of metal seal and, thereafter, the shape, metal, alloy, coating and plating involves a compromise of a number of factors including cost, permissible leakage rate, desired seal life, etc.

Sadoff pp. 34-38; Exhibit O.

* * * * *

32. From 1958 to 1960, High Pressure was housed in the cellar of Taylor's home in Beltsville, Maryland and it had no paid employees. High Pressure's initial investment in machinery and materials was approximately $2,000. In 1960, High Pressure moved from Taylor's basement to a rented three-car garage in Beltsville, Maryland, and by

Excerpts From Findings of Fact Agreed to by All Parties

1960, High Pressure's investment in machinery and materials had risen to $5,000 and it had one paid employee.

Taylor pp. 667-669, 700-701, 800-801.

* * * * *

34. From 1958 to 1960, Taylor tried, on a part-time basis, various methods of obtaining the desired C shape by metal forming. For the most part Taylor worked alone except for some part-time help from two machinists. The closest metal seal company was 500 miles away and very little metal work was done in the Beltsville area.

Sadoff p. 76; Taylor pp. 669, 700-701, 800-802, 826-827.

* * * * *

38. The two-piece die, like the four-piece die, consists of a matching top and bottom half with half the C cut into the cavity of each piece. The two halves are aligned by a center pin. The center pin does not act as a stop and, therefore, it does not have to be the same diameter as the diameter of the metal-C-ring to be formed. The only function of the center pin is to align the top and bottom of the die.

Taylor pp. 711-714, 817-821; Exhibit 35.

* * * * *

52. P.S.I. obtains the final C shape by either die forming or roll forming.

Sadoff pp. 243-244.

* * * * *

63. In addition to metal-C-rings, P.S.I. manufactures metal-E-seals, flanges and couplings. The flanges and coup-

lings are sold as part of a unit which contains a metal seal and the unit is referred to as a ducting joint.

Sadoff p. 27.

64. It is P.S.I.'s claim in this litigation that its metal-C-ring and its metal-E-ring are manufactured by a proprietary process.

Sadoff p. 68.

65. With regard to the flanges and couplings it manufactures, P.S.I. does not claim that the manufacturing process is proprietary. P.S.I. does claim, however, that the actual dimensions of the finished flanges and couplings are proprietary.

Sadoff pp. 98, 112-117.

* * * * *

67. There are no written instructions or written rules at P.S.I. concerning the use or disposition of metal-C-ring drawings which leave P.S.I.'s plant.

Taylor pp. 917-918.

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76. By 1963, P.S.I. had moved to its present location on Old Baltimore Pike in Beltsville, Maryland.

Taylor p. 724.

77. Prior to June, 1973, the rear portion of P.S.I.'s plant was allocated to metal-C-ring manufacture. Until recently two large sliding glass windows, approximately three feet by four feet, were located along the rear wall of P.S.I.'s

metal-C-ring manufacturing area. The rear wall was an exterior wall which fronted on a clearing and adjacent woods.

Sadoff pp. 76-80, 87-90; Taylor pp. 909, 911; Exhibits 9, 9A, 11, 11A and 11B.

* * * * *

79. In June, 1973, P.S.I. expanded its plant and eliminated the exterior windows along the rear of the plant.

Sadoff pp. 76-80, 87-90, 96; Taylor p. 911; Exhibits 9, 9A, 11, 11A, and 11B.

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87. At the time Sadoff joined P.S.I., it did not have a marketing manager and P.S.I. was having difficulty generating enough sales volume to support the overhead of the company.

Sadoff pp. 574-575.

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91. From 1968 to date, P.S.I. has grown substantially. It has gone from approximately forty or forty-five employees in 1971, to approximately ninety employees in 1975.

Sadoff p. 175; Taylor pp. 851, 886.

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104. In 1970, Sadoff prepared an agreement entitled "Employee Agreement Relating to Inventions, Proprietary Information and Related Matters." The agreement was executed in 1971, by Taylor, Sadoff, and Halling, a new

Excerpts From Findings of Fact Agreed to by All Parties

P.S.I. employee. In early 1973, Bojanowsky, another employee, executed the agreement.

Sadoff pp. 108-110, 346; Exhibit 12.

105. The agreement contains a provision concerning the nondisclosure of proprietary or confidential information.

Sadoff pp. 108, 345, 356; Exhibit 12.

106. In 1971, when Kramer was hired by P.S.I. Taylor and Sadoff knew that Kramer would learn the details of P.S.I.'s metal-C-ring manufacturing process and that Kramer, because of his position at P.S.I., would become one of the most knowledgeable employees at P.S.I.

Sadoff pp. 356-357.

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117. Following the institution of this action and the Taylor and Sadoff depositions, P.S.I. had all supervisory personnel at P.S.I. execute a nondisclosure agreement.

Sadoff pp. 346, 638.

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122. There was no written procedure at P.S.I. that set forth a policy of or practice at P.S.I. of advising its employees that P.S.I. considered its metal-C-ring process confidential and that the process should not be disclosed.

Sadoff p. 358.

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Excerpts From Findings of Fact Agreed to by All Parties

131. At the time P.S.I. placed the advertisements contained in Exhibits 7, 7A and 7B, P.S.I. was the only company manufacturing and selling formed metal-C-rings in the United States.

Sadoff pp. 377-379; Sommer pp. 1215, 1223.

* * * * *

133. Exhibit 7, in relevant part, states "Both have Taylor's exclusive curved seal line" and "Produced to exacting standards of quality and reliability by Taylor's exclusive economical process."

Sadoff pp. 69-74, 376-377.

134. Exhibit 7A, in relevant part, states "All have Taylor's exclusive seal line" and "All economically produced by Taylor's exclusive process, by Pressure Science, Incorporated."

Sadoff pp. 69-74, 376-377.

135. Exhibit 7B, in relevant part, states "Resilient metallic seals, Taylor's designs and processes produced only by Pressure Science, Incorporated."

Sadoff p. 73.

* * * * *

167. In addition to the metal-O-ring, A.P.C. or its subsidiary manufacture and sell the Lo-Load seal (a metal-V-ring), the clam seal and the T.E.C. ring. A.P.C. also offers for sale the Corruseal and the Corruplus seal.

Sommer pp. 1183, 1296-1297.

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Excerpts From Findings of Fact Agreed to by All Parties

201. The metal-C-rings initially manufactured by A.P.C. were made from metal-O-rings. The metal-O-ring was placed in a fixture and, depending on the type of metal-C-ring desired, either the inside, outside, or face of the metal-O-ring was cut out. The machined metal-C-ring thereafter was finished using the same techniques A.P.C. used to finish its metal-O-rings. Once A.P.C. obtained the desired C shape, the metal-C-ring was polished, heat treated, sand blasted, electroplated, stretched, sized and packaged in the same manner as metal-O-rings.

Sommer pp. 1349-1351; Sniegowski pp. 1523-1524.

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208. The discussions at A.P.C. centered on the various ways of obtaining the necessary hoops and the various methods of forming those hoops into the desired C shape.

Sommer pp. 1352-1362; Sniegowski pp. 1529-1532; Exhibit R.

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214. Prior to joining A.P.C., Sniegowski had been chief engineer at D.S.D. Magnatech, a special metal seal manufacturer.

Sniegowski pp. 1515-1516, 1536-1537.

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266. Today A.P.C. uses a split metal die to form its small to medium sized internal and external metal-C-rings. The metal die is aligned with a single center dowel pin and half

the C shape is cut into the top half of the die and half the C shape is cut into the bottom half of the die.

Sniegowski pp. 1817-1818; Exhibit 72.

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268. It is P.S.I.'s position in this litigation that a split metal die aligned by a single center dowel pin with half the C shape cut into the top half of the die and half the C shape cut into the bottom half of the die is a proprietary concept of P.S.I. Specifically, P.S.I. claims four things make the split die it uses to form metal-C-rings unique: first, the fact that half of the C image is cut into the top half of the die and half of the C image is cut into the bottom half of the die; second, the fact that a single center dowel pin is used to align the top and bottom halves of the die; third, the fact that the interior portion of the hoop is unsupported during the forming of the C shape; and fourth, the fact that there is a stop cut into each die cavity.

Sadoff pp. 451-453, 435-454; Exhibit 35.

* * * * *

269. It is P.S.I.'s contention in this litigation that the split die it uses to form its internal and external metal-C-rings is unique and that it would require an invention to duplicate it. It is P.S.I.'s position that a tool and die maker would not think of such a simple die and, if asked to design a die to form metal-C-rings, a tool and die maker would design a much more complex and expensive die.

Sadoff pp. 454-459; P.S.I. Answers to Interrogatories #2.1.

* * * * *

Advanced Products' Motion for Post-Trial Re-Argument

For the reasons set forth in the attached memorandum, The Advanced Products Company ("A.P.C.") moves this Court for re-argument limited to the issues of whether Pressure Science, Incorporated's ("P.S.I.") metal die is a trade secret and whether A.P.C. improperly appropriated it.

Dated: September 18, 1975

Shaun S. Sullivan
Attorney for Defendant The
Advanced Products Company
Wiggin & Dana
P. O. Box 1832
195 Church Street
New Haven, Conn. 06508

Advanced Products' Memorandum in Support of Motion for Post-Trial Re-Argument

Following post-trial argument, this Court advised the parties that its preliminary view of the evidence was that A.P.C. had received some advantage with respect to the metal die by the hiring of David Kramer and that the Court was inclined to grant some limited form of relief to P.S.I. The Court noted that it had not had an opportunity to review the parties' Proposed Findings of Fact carefully and that its views might change after it had done so.

In view of the Court's comments, A.P.C. respectfully moves for oral argument limited to the central issues of whether the metal die in question is a trade secret and, if so, whether A.P.C. improperly appropriated information with respect to that die. A.P.C. respectfully suggests that the Court's preliminary views are not supported by the record and that further argument limited to these central issues would be helpful to the Court. A.P.C. says this for the following reasons:

1. The Court stated after oral argument that A.P.C. received assistance from Kramer which was helpful to A.P.C. in getting into the formed metal-C-ring business. A.P.C. has never denied this. It is irrelevant, however, to the basic question of whether that assistance violated any trade secret right of P.S.I. The evidence shows that it did not.

2. P.S.I. does not claim that the fact that it uses a die to form metal-C-rings is a trade secret. Nor does P.S.I. claim that it would take a substantial period of time to make the die in question. P.S.I.'s trade secret claim with respect to

the die is limited to the claim that the die is so simple that no one would conceive of the idea of using such a simple die to make formed metal-C-rings. There is no evidence to support this claim. Indeed, all the evidence is to the contrary.

3. A.P.C. had the idea of using a simple split die with half the C shape cut into the top and half the C shape cut into the bottom of the die prior to Kramer's arrival. At D.S.D. Magnatech Sniegowski had successfully made such a die to manufacture metal-C-rings. Also, Sniegowski and Sommer had extensive discussions on the subject at A.P.C. and those discussions are reflected in a memorandum (Ex. R) prepared before Kramer's arrival. Moreover, prior to Kramer's arrival at A.P.C., Sommer had already decided to die form small to medium metal-C-rings in a simple split die and to roll form large metal-C-rings.

4. Prior to the hiring of Kramer, Sommer had received Exhibit R which states, "metal die set split . . . with half the C in the top and bottom." When A.P.C. began to form metal-C-rings in a die set split with half the C in the top and bottom, even with Kramer's assistance, Sommer had no reason to believe that A.P.C. was using something that belonged to P.S.I.

5. P.S.I. claims that the type of die it uses to form metal-C-rings is unique because it is simple and straightforward. P.S.I. further claims, without the support of any expert opinion that, if asked, a conventional tool and die maker would overlook such a simple solution and suggest a more complex and expensive die. All of the expert testimony on this issue is clearly to the contrary.

6. A.P.C. called Edwin Barton and George Merwin, two local tool and die makers with many years of experience in the field. Both were highly qualified in die design and both testified, without qualification, that, if asked to make a die to form metal-C-rings from TIG welded hoops, their respective companies could have easily done so and would have made a simple two-piece "put and take" die which each of their companies had made many times in the past.

7. During oral argument, the Court suggested that the opinion of the tool and die experts called by A.P.C. may have been influenced by the fact that they were familiar with the design of the die in question prior to testifying and, absent that prior knowledge, they may have considered the design of a die to form a metal-C-ring a more difficult problem. A review of the testimony of Barton and Merwin does not support that conclusion. In this connection, it should be noted that when the Court asked Mr. Barton whether his conclusion to use a simple two-piece die was the result of his particular expertise, Mr. Barton replied that the solution was so elementary that he personally knew 30 or 40 tool and die makers in Connecticut who, if asked to make a die to form metal-C-rings, would have designed and made a similar die.

8. It is also significant that both experts testified that they usually bid a job prior to any design work and that their quotation includes the cost to design and make the die. Here, both Barton and Merwin testified that they would have given a firm quote of anywhere from $1,500 to $2,000 to A.P.C. and that figure would have included whatever design

work was necessary Thus, if it took either of their companies longer than the estimated two or three weeks to design and make the die, A.P.C. would have received the finished die at the same price.

9. According to P.S.I., it is the very simplicity of the die that makes it worth protecting. P.S.I. concedes that the die is so simple that anyone seeing it open could duplicate it in a minute. While a quick glance or imprudent sentence could compromise P.S.I.'s alleged "secret", the evidence shows that P.S.I. failed to take the steps necessary to protect that "secret". P.S.I. did not advise its employees that the die was a secret. The die was made in a high traffic area of the plant and two waist-high glass windows provided an uninterrupted view of P.S.I.'s metal-C-ring die forming. Visitors were given tours of the plant that included the forming of metal hoops in the die and they were not warned against revealing any information with respect to the die. P.S.I. has over 380 former employees and prior to leaving none was advised that the design of the die was confidential.

9. During oral argument it was suggested that P.S.I. had testified that it would take a company like A.P.C. approximately five years to duplicate the die in question. There is no such testimony. P.S.I.'s five-year estimate, if it can be called that, was the time Taylor estimated it would take a company like A.P.C. to duplicate P.S.I.'s entire metal-C-ring process. Furthermore, it took Taylor less than two years, working alone on a part-time basis with little metal forming experience to speak of and a capital investment of less than

$5,000, to settle upon the four-piece die which P.S.I. continues to use today, and which is for all intents and purposes the same as the two-piece die.

10. Any competitive advantage A.P.C. received from Kramer with respect to the die was negligible at best. During the first seven months of Kramer's employment, A.P.C. sold $3,300 worth of metal-C-rings. Moreover, A.P.C. was unable to produce metal-C-rings on a production basis for more than a year after the hiring of Kramer because A.P.C. did not have a production welding fixture. Accordingly, unless A.P.C. could not itself have produced the die in question in less than a year, it received no competitive advantage at all from Kramer.

In view of the voluminous record in this case and the fact that the Court has now tentatively narrowed its consideration to the metal die, A.P.C. respectfully suggests that oral argument directed solely to this question would materially assist the Court in deciding this case.

Dated: September 18, 1975

Respectfully submitted,

Shaun S. Sullivan
Attorney for Defendant The
Advanced Products Company
Wiggin & Dana
P. O. Box 1832
New Haven, Connecticut 06508

* * * * *

Excerpts From the Testimony of Bernard J. Sadoff, Jr.

BERNARD J. SADOFF, JR., called as a witness by the plaintiff, being first duly sworn, testified as follows: that he is vice-president of the plaintiff, responsible for all aspects of plaintiff's marketing; that he graduated from the Massachusetts Institute of Technology in 1955 with a bachelor's degree in engineering [24]; and that since 1955 he has been employed in various industrial sales and engineering positions [24-27]. Mr. Sadoff further testified in part as follows:

* * * * *

it be likely that you may get an order for, say, five hundred seals, and would you give them to a stock clerk, and would he go to a bin of standard sizes and just scoop out five hundred of these seals? Is that the --

A No, sir, it would not.

Q Would you explain how orders are placed and filled to your customers.

A The orders are placed and the material -- the seals, themselves, are manufactured to order. Frequently raw material is available, although in many instances the raw material is not ordered until after the order has been placed on us with our customer.

Q So these are made to order?

A That's correct.

Q It would not be likely or usual to have large bins of standard sizes?

A That's correct.

Q Is it possible that you might get an order for a certain size C-seal and never get an order for that particular size again?

A Yes. That's very common.

Q Does Pressure Science have the capability to provide C-seals to fill orders in varying sizes?

A Yes, sir. We do. We --

Q When was the move made; do you know?

A I would say around June of '73, would be my guess.

Q Are there any windows presently along the rear of the plant?

A No, there are not.

Q That is now the section where the seal manufacturing takes place?

A That's correct.

Q During your time at Pressure Science, have you ever been aware of a problem with uninvited visitors to the plant?

A Yes, I have.

Q Could you tell when this was and how this problem manifested itself to you?

A Well, I believe almost since we've been in business we've had relatives of employees who -- we employ a lot of unskilled labor, and frequently their cousins and aunts and so forth are shy about coming around the building into the front lobby and having themselves announced, so they'll come down our driveway, which runs along the side here, next to the employees' entrance, and they'll park car here and they'll come in through this doorway here. And the problem was that they would, you know, slow down

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production and they would -- well, you just -- it's not a very businesslike way to operate, and so we would try to send them around to the lobby and be properly announced.

Q With reference to one of the photographic exhibits, can you just point out to the Court what one of these visitors coming through the employees' entrance would be likely to see?

A This is what the -- this would be Exhibit 11-A, is taken at the employees' entrance, the photograph at the bottom of Exhibit 11-A, and what they would be likely to see is conventional machine tools, such as a turret lathe, in operation. There is no way that they are going to see any of the operations on our -- on our C-seals being performed.

Q Now I am pointing to Plaintiff's Exhibit 10 and this section labeled "Machine Shop."

I assume this is what a visitor would see coming to this door?

A That's correct.

Q What does Pressure Science do in this portion of the plant?

A Okay. Perhaps I could outline that portion of the plant in yellow.

This is the machine shop area, and in this yellow area we make flanges and couplings.

A Yes, Mr. Kelly. There's no -- the name "production manager" doesn't appear on this chart. The reason is we characterized Mr. Kramer's position as works manager, as a -- quality control people do not like to see a production manager have a quality control manager report to him. So we show production supervisor seal shop, production supervisor machine shop as reporting to the works manager and being on the same level as quality control.

This is -- accurately depicts it. I was just trying to explain the term "works manager" rather than "production manager." Those were his responsibilities.

Q Who did Mr. Kramer report to in the corporate structure?

A The president and general manager, Mr. Dudley Taylor.

Q During the course of his employment as production manager, did Mr. Kramer participate in company policy discussions with other members of management?

A Yes, he did. We had an operating committee consisting of Mr. Halling, the engineering manager, myself as marketing manager, Mrs. Taylor as the accounting manager and Mr. Kramer as the works manager.

Q How often did this operating committee meet?

A Once a week.

Q And Mr. Kramer customarily attended these meetings?

A Yes.

Q In general, what did the operating committee discuss?

A We discussed the -- the purpose of these meetings was so that the managers of the business would know what each other were doing. So the chairman at a meeting would be Mr. Taylor, or, in his absence, I would be the chairman of the meeting, and the people in turn would state what their problems were for that -- since our previous meeting, which direction the company should take, what -- generally setting policy for the company.

Q Did Mr. Kramer ever have occasion, to your knowledge, to meet with the board of directors of the company?

A Yes. We held board meetings four times a year, and Mr. Kramer would be alerted -- wouldn't receive official notification of a meeting, but he would be advised that the meeting was going to be held on a certain Tuesday. Normally our meetings would commence around four-thirty in the afternoon, they'd be held in Mr. Taylor's office, and frequently, shortly after the meeting started or sometime after the thing was actually organized, Mr. Kramer and frequently, but less so, Mr. Halling would be invited to attend the tail end of the meeting. Then we'd normally go to a restaurant for dinner, and Mr. Kramer was almost invariably included in that gathering.

Q By the way, are you a director of Pressure Science?

A Yes, I am.

Q So you did attend meetings?

A I attend all board meetings, yes.

Q In the scope of his employment with Pressure Science, did Mr. Kramer become familiar with the process by which Pressure Science manufactures C-seals?

A Yes, he certainly did.

Q Did he also have access to engineering drawings and plans of Pressure Science?

A Yes. He had access to all of them.

Q In fact, was access limited in the Pressure Science plant in any respect?

A In the beginning it was not. Toward the end -- I would say that in -- sometime around November of 1972 his access to Mr. Taylor's office was limited.

Q Do you know why this occurred?

A Yes.

We have a bonus system in the company, and the bonuses are set by the pay committee of the board of ally.

Q Mr. Sadoff, you stated that you had examined all six of these exhibits; is that correct? You have studied all those?

A That's correct.

Q Let me just ask you, in general, in your review of these exhibits, have you found reference to any procedure, to any type of die, wherein the stock was revealed to be in compression and not supported on both sides.

A I have seen no example of any of those exhibits in which the stock is not supported on both sides.

Q Mr. Sadoff, I have Plaintiff's Exhibit 35 here, the die, and ask if you have -- again excluding from your answer any reference to the Advanced Products Company -- had occasion to see a die similar to Exhibit 35 in your experience.

A Other than at Pressure Science?

Q Other than at Pressure Science.

A No, sir, I have not.

Q Have you seen a similar type die to Plaintiff's Exhibit 35 in any of the literature that you happened to have reviewed?

A I have not.

Q During his employment at Pressure Science, was

Q As you sit there today, can you tell me what methods within your knowledge could be utilized to form a C-shape?

A To go out and do it right now, you mean?

Q Yes, sir.

A The method that Pressure Science utilizes and to which I testified to.

Q What is that method?

A The die that we use.

Q Any other methods?

A That I've seen done?

Q Yes, sir.

A I haven't seen any other done. I can conceive of other methods.

Q How about rolling?

A Oh, excuse me, you are right. I could roll-form it to the final shape.

Q Do you know of any others, whether they could be utilized by Pressure Science or anybody else?

A Yes.

Q Practical methods?

A Yes.

Q What are they?

A You could cut the center out of a metal O-ring.

Q Any others?

A Well, I think you could probably make an arrangement of pie dies, as was illustrated.

You are asking me things which -- could they be developed or have I seen it done?

Q No. As you sit there today, within your knowledge, the practical means available.

A It could be done with high-speed transfer dies, for instance. That method would require perhaps some slight modification of the C-shape. You would probably have to put a little flat on the outside diameter.

Q Any others?

A You can do it with rubber press forming, I imagine. You might have some difficulties with the return.

Q Any others?

A Not that I can think of offhand.

Q Of the six methods that you listed --

THE COURT: I only got five. Which six did he list?

MR. SULLIVAN: I will list them: die forming, roll forming, cutting out metal O's, pie die, high-speed transfer die --

THE COURT: Oh, wait a minute. I thought that was the same thing. High die?

MR. SULLIVAN: I think he said "pie die," your Honor.

THE COURT: Oh, pie die.

MR. SULLIVAN: P-i-e.

THE COURT: Now I have six. Go ahead.

BY MR. SULLIVAN:

Q With the six methods that you listed, what, in your judgment, would be the preferred method for a company that wanted to go in the business on a high volume basis and make money at it?

A When you say "high volume" you mean a lot of customers for a relatively small number of pieces or to have a single customer that was buying a half a million pieces a month, say? Which type of -- which do you mean?

Q By "high volume" I mean a number of customers for not a whole lot of pieces.

A I think we have the best way of doing it.

Q What is that way?

A By the use of the forming die which we introduced in evidence here.

THE COURT: That would be the most economical and most profitable, in your opinion?

THE WITNESS: Yes, your Honor.

Q Taking you back to June of 1973, which is about

Science employees?

A Clyde Phillips and Ron Bose, and I guess that's it.

Q Do you know from your own knowledge whether or not Clyde Phillips or Ron Bose were ever asked to execute a nondisclosure agreement at the time of termination?

A I -- to my own knowledge I don't know, but --

Q Okay.

A Okay.

Q Can you give me an estimate of the number of Pressure Science employees from the time you joined Pressure Science through June of 1973 that would have had knowledge of certain aspects of the claimed proprietary C-ring processes? Can you give me a number?

A Well, when you say "certain aspects," I assume that --

Q Do you understand what I mean by that?

A I think so. I'm -- almost everyone who's ever worked in our seal shop would have knowledge of certain aspects of the plant, so, then, all you would have to do is look through all our closed-out ex-employees files and add up that number of people, over a seven-year period, and assuming that they -- well, assuming they weren't working in our machine shop area, you would have to give that as the number, and I -- off the top of my head, I'd guess maybe that was seventy people or so.

Q The total number of PSI employees for that time who would have had knowledge of certain aspects of Pressure Science's C-seal manufacturing process would total seventy?

A That's my estimate.

Q Taking the period 1968 through June of 1973, do you have any knowledge of what Pressure Science's turnover rate was?

A It's varied rather tremendously and I have heard figures, but I don't have any personal knowledge of it.

Q Have you ever seen that document before that I just handed you?

A No, I have not.

Q Does that at all refresh your recollection as to what the turnover rate might have been for the time period in question?

A Well, I would assume that -- that the -- that my estimate was low in terms of the total number of people. However, this doesn't show which of these were in our machine shop and which were not.

Q That was not my question.

Does it refresh your recollection as to the turnover rate?

A Yes.

Q What does that document indicate to you?

A It says in 1970 our turnover rate was 1.81. We had forty-eight employees. Apparently -- I -- I don't know exactly how to interpret it, but I assume that this means that forty people were on our -- forty people were on our payroll during the year who were not on our payroll during the last day of the year.

And the next year, at the end of the year we had fifty-two, and the number of W-2's issued was 101. So that forty number became fifty.

In 1972, when Kramer was there, we had sixty-four at the end and 165. So it was a hundred people.

And after Kramer left we had seventy-two at the end, 150, so it dropped down to eighty-eight people.

I guess that's the arithmetic.

So the total number of people, then, if you based it -- if you a ssume that all of those people fell within the scope of any aspect of the seal process, which I've already testified to they do not, then you just add up those numbers and you come up with the number of people. Did I estimate seventy? It could be a hundred and forty, then. Is that reasonable from that? I was off by a factor or two.

Q Does this document indicate to you that for the years in question Pressure Science's turnover rate was in excess of 50 percent?

A The question is how many people. If you have two people --

Q I asked you the rate of turnover. We went through the rate.

A Did I say what the rate of turnover was?

Q Oh, I asked you that. Can you tell me from looking at this document? Does it help you?

A Well, there's a column there. You can read the numbers off. The total number of people by that arithmetic looks to me -- I estimated seventy. I had never seen the document before. Maybe they add up to 210. I was off by a factor of three, except that that -- that --

Q You have answered the question. That is fine.

A Okay.

MR. SULLIVAN: I will offer this as Advanced C.

THE COURT: Any objection?

MR. KELLY: Your Honor, I do not have any objection that I know of, but I have the same problem again; it is just a question of relevancy. I do not know how the turnover rate is relevant to the process here. But I am not going to object.

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THE COURT: All right, Exhibit C.

BY MR. SULLIVAN:

Q Would it be fair to say, for the years in question that we have been discussing, that Pressure Science had a problem keeping employees?

A Yes.

Q Would you say that Pressure Science, for those years, had a high turnover rate in comparison to other companies?

A In terms of the unskilled labor, I'd say that it wasn't unusually high. It was higher than I would have liked it to be, however.

Q With respect to any employee that left from the time that you came with the company through June of 1973, he or she would not have executed any nondisclosure agreement; is that correct?

A That's correct.

Q Can you tell me, with respect to David Kramer, where he fit in in terms of Pressure Science's organizational chart?

A He was on the same level as the managers of the -- what? -- the three basic departments of the business. He was on my level when I operated as marketing manager, Halling's level as engineering manager and Mrs. Taylor's level as accounting manager.

Q So would it be fair to say that Kramer was on the same level of importance within the company as you and Halling?

A In our roles as managers, that's correct.

Q Would it be also fair to say that he was on the same level as Miles?

A No.

Q No? Where does Miles fit in?

A Seal production supervisor, reporting to Kramer.

Q So Kramer would be higher than Miles?

A As shown on that chart, yes, sir.

Q Do you recall whether or not David Kramer was ever asked to sign a nondisclosure agreement when he was hired by Pressure Science?

A I don't -- I did not ask him to.

Q So the answer is you do not have any recollection?

A To my knowledge -- well, I recall that I did not ask him to.

Q When you hired David Kramer, you did know that he was going to become knowledgeable with respect to your C-ring manufacturing techniques; did you not?

A Yes.

Q When you hired David Kramer, Exhibit 12 was in existence; was it not?

A Yes, it was.

Q In Exhibit 12, paragraph six, that is an effort by Pressure Science to have an employee consent in writing to not disclose certain proprietary data?

A It is.

Q But you did not ask Kramer to sign one of these things?

A That wasn't my responsibility.

Q Whose responsibility would it have been?

A His direct supervisor. It would have been Mr. Taylor's responsibility.

Q Who hired Mr. Kramer?

A The company hired him to report to Mr. --

Q Did you take part in that hiring process?

A Certainly, yes.

Q Who else played a part in it?

A Mr. Halling, Peter Gravian, a consultant to the business -- when you say play a part, we interviewed him, and we gave Mr. Taylor advice as to whether he should be hired or not. Mr. Taylor's hired people with -- that I've advised him not to hire.

Q At the time you hired David Kramer, is it fair to say that you knew at that time that, of all the employees at Pressure Science, he was going to become one of the most knowledgeable of your C-ring operation? Isn't that correct?

A I think he should have signed it, and I think it should have been put to him.

Q Did I ask you that?

A Okay.

Q Okay.

A What did you ask me? I'm sorry.

Q At the time you hired David Kramer, isn't it fair to say that you were aware and Mr. Taylor was aware that David Kramer was going to become knowledgeable at Pressure Science of the C-ring operation in detail?

A Yes.

Q At that time, as I understand your testimony, from here today and from your depositions, it was Pressure Science's position that that information was proprietary to it?

A Absolutely.

Q And it was also Pressure Science's position that that information was important to it?

A Absolutely.

Q Very important to it?

A Vital.

Q But nobody asked him to sign this?

A I didn't -- I don't know that.

Q Okay. You did not?

A I didn't ask him to sign it.

Q Is there anything, within your knowledge, in writing at Pressure Science which sets forth a practice of advising employees not to disclose confidential information?

A We don't have such a --

Q Is there?

A No.

Q As I understand it, Mr. Kramer was hired in November of 1971 and was terminated in May of 1973; is that correct?

A That's right.

Q During that time period, November of 1971 to May of 1973, what other companies were selling C-rings, to your knowledge?

A To my knowledge, Advanced Products Company.

Q Nobody else?

A Not that I know of. United Aircraft -- United Aircraft Products from Dayton, Ohio, may have, but to my own knowledge I -- I do not believe that they were.

Q I believe you testified earlier that a C-ring is used in applications that an O-ring can be used?

A Are you referring to a metal O-ring?

Q Metal O-ring -- I am sorry.

A Most O-rings made are made of rubber.

Q I am talking about the metal O-ring.

A Would you rephrase the question -- restate the question.

Q Did I understand your testimony properly that, in your opinion, the metal C-ring and metal O-ring can be used in similar applications?

A That's correct.

Q Would it be fair to characterize, for this period of time, therefore, Advanced Products as a competitor of Pressure Science--

A Yes.

Q -- for metal seal sales?

A Yes.

Q Do you recall that prior to David Kramer's termination in May of 1973 he advised you that he had visited Advanced Products' plant?

A Yes.

Q At the time David Kramer was terminated in May of 1973, do you know whether he was asked to sign any document?

A I've been told that he was asked to sign a document. I wasn't present when he was asked to sign a document.

Q Do you know whether that document he was asked to sign was a nondisclosure agreement?

A I've been given a document that I understand he was asked to sign, and it doesn't have any nondisclosure clauses in it, to the best of my knowledge.

Q Were you involved personally in the document that you have just testified to?

A No, I was not.

Q With respect to your testimony as to what is proprietary with respect to PSI's C-ring manufacture, is it fair to say that Pressure Science considers the fact that it uses a die with part of the shape in the top and part of the shape in the bottom, which is kept aligned with a center dowel pin -- is that a proprietary fact?

A Yes.

Q That is something that is confidential, kept confidential at Pressure Science?

A Yes.

Q Is it also fair to say that Pressure Science's use of rollers to shape C's is a fact which Pressure Science considers confidential?

A Yes.

Q Is it also fair to say that the fact that Pressure Science TIG-welds thin strip with separate tabs, using a

C-ring drawings you do not put a stamp on it, or you do not put that message on it?

A The notice on it, that's correct.

Q And the reason you do not do it is because in one, with respect to C-rings, you are trying to protect a manufacturing process, and as long as you keep that information confidential you do not have to tell anybody anything about it, about not using it; is that correct?

A Correct.

Q With respect to the ads that you testified to that were placed in Machine Design, Plaintiff's Exhibit 7, can you tell me who was involved in the preparation of that ad?

A I was.

Q Can you tell me what the purpose of that ad was?

A To obtain more business for the company.

Q Was the purpose of this ad also to indicate to the reader that PSI had a proprietary process--

A Absolutely.

Q -- in its manufacture of C-rings?

A Absolutely.

Q Can you tell me where in here it says that PSI's process is proprietary?

A "Both have Taylor's exclusive curved seal line,

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best because" -- and it says -- and then "Produced to exacting standards of quality and reliability by Taylor's exclusive economical process."

Q So it is your testimony that when you put that ad in there that was an effort by you to tell the world that you had a proprietary process with respect to the manufacture of C-rings?

A Yes.

Q Why didn't you use the word "proprietary"?

A Well, "exclusive" -- I'm not really an advertising man, but "exclusive" sounds better; to me, at least.

Q But you do not use the word "proprietary" any place in here, that is in your claim?

A The word "proprietary"?

Q Yes.

A No, but if you have something exclusive --

Q I just asked you --

A That's correct.

Q It was not your intent in framing that ad to convey to the reader that Pressure Science was the only company that at that point in time was selling a precision-formed C-ring? That was not your intent, using the --

A Oh, no, certainly not.

Q Oh, it was not your intent?

A The intent was to tell them that these were made exclusively by Taylor's process, not by just -- it was not the intent to say this is the only precision-formed seal in the world.

Q No, C-seal. That is what I am talking --

A Well, as a matter of fact, as a practical matter, it was the only C-seal around, but we wanted to --

Q I am just asking you, when you put this ad in the book, wasn't it a fact that Pressure Science was the only company --

A Right.

Q -- that was selling precision-formed C-seals.

A Right.

Q It had the exclusive line?

A No, it didn't have the exclusive line.

Q Why didn't it have the exclusive line?

A It had the exclusive process. It was Taylor's exclusive process.

Q With respect to Taylor's exclusive line?

A It doesn't say "line"; it says "process." Look at the bottom.

Q "Both" --

A No, the curved seal line. That doesn't say Taylor's. Here, "Taylor's exclusive economical process."

Q Okay, I will take that.

With respect to that, was anybody, when this article was published in June of 1969, making R-rings using a metal forming process?

A No.

Q When it says up here --

A June of '69? Excuse me, it's quite possible that Advanced Products was in fact machining them --

Q No, I said precision metal forming.

A No.

Q When you say up here "Both have Taylor's exclusive curved line," what does that mean? What is the exclusive curved line?

A Does it say "exclusive"? Excuse me, let me see that. I don't think it said Taylor's -- oh, yes, Taylor's exclusive curved seal line, yes, "Best because" -- well, what it is is this: Most, like LoLoad seals and Parker V-seals, have a seal line -- I drew yesterday -- shall I mark this chart somehow?

Q No.

A You see, this is machined -- this is flat here, and the problem is, when you squeeze this down, this flat surface, it starts to seal here and it moves all the way-- suddenly moves over here, as you squeeze this down. This tips down like this, and that's bad news. And we wanted to point out that we were the only people that were making this type of seal that had a curved seal line; our seal line's curved.

Q Nobody else was making that at that time?

A That's right.

Q With respect to Exhibit 8, the inside cover, which you testified about, it says there:

> "The plant includes modern automatic equipment for producing flanges, seals and couplings to proprietary company designs."

Is that correct?

A Yes.

Q The flanges and seals we discussed earlier. Your claim with respect to those is that the item as made is proprietary, the tolerances on the drawings, the design drawings, are --

A That's what it means, proprietary company designs. It means that the product is a proprietary company design.

Now, the next sentence goes on to point out --

Q I did not ask you a question.

A Okay.

Q With respect to that sentence, "proprietary company designs" means the product; okay.

You do refer to seals in there; don't you?

A You have very small amount of space in a catalog.

Q I am just asking you: Do you or don't you?

A Yes. Yes. Surely.

Q So is that an effort to claim that the design of the product, the C-seal product, is proprietary? That is not your claim here; right?

A Yes, it's a proprietary design when used in certain applications. For instance, our E-seals are used in our ducting joints. The E-seal ducting joint is a proprietary company design, and an E-seal is a seal, and we have a patent on the E-seal ducting joint.

Q I could be mistaken, but I thought you said in your direct testimony when this was read to you that that sentence was a claim?

A The next sentence is the claim.

Q The next sentence?

A Certainly.

Q That has nothing to do with it?

A No, they both have something to do with it, but you can't -- the two of them there are in the same paragraph.

Q I am not asking for an explanation.

THE COURT: Do not get argumentative here. Why don't we move along.

MR. SULLIVAN: Okay.

BY MR. SULLIVAN:

Q It is the next sentence, and that sentence says, "Most all processing is done 'in-house,' including tooling, inert gas welding and heat treating, and electroplating"?

A And that's a --

Q That is a sentence where you claim that that conveys to the reader that the process is confidential and proprietary; is that your testimony?

A The paragraph contains that.

Q That sentence. Does that contain it?

A The two sentences as read together, the way I read them, conveys that we make proprietary products and we make 'em by proprietary processes.

Q That last sentence -- does that sentence say any place in there that tooling, that inert gas welding, heat-treating and electroplating -- do they use the words "confidential" or "proprietary" in that sentence?

A As I read this --

THE COURT: What difference would it make?

Q I did not ask you that.

MR. SULLIVAN: His claim, your Honor, is that reading this would convey to the reader --

THE COURT: What difference would it make?

MR. SULLIVAN: Our claim in the suit, your Honor, is we had no idea prior to the filing of the complaint in this action that they claimed anything was confidential or proprietary down there, and he is trying to say on direct that if you read this it is brought home to you.

THE COURT: All right.

BY MR. SULLIVAN:

Q With respect to your flanges and couplings, I believe you testified that you have a practice of sending out a letter requiring a written acknowledgement of receipt of proprietary data, if you send out any proprietary data; do you recall that?

A Yes.

Q Is it your testimony that when you send out proprietary data with respect to C-rings you have a practice that you get a letter back acknowledging that receipt of that data is proprietary?

A We don't send out proprietary data with respect to C-rings.

Q I did not ask you that.

A Well, how can I have a practice for something I don't do?

Q So it is your testimony that you do not require

AFTERNOON SESSION

BERNARD J. SADOFF, JR., resumed and testified further as follows:

THE COURT: Are the parties ready to proceed?

MR. SULLIVAN: Yes, your Honor.

CROSS-EXAMINATION (CONT'D)

BY MR. SULLIVAN:

Q With respect to your last answer, Mr. Sadoff, have you had an opportunity to go through the factories of metal seals companies? Have you gone through any?

A Only piston ring type seals.

Q How about seals that would be in competition with the more exotic seal, say an O-ring or a C-ring?

A No, I have not.

Q With respect to the utilization of separate tabs in connection with the welding of thin metal strip, and using the dimensions we spoke about earlier today, I believe you testified the hold-down fixture, multi-fingered hold-down fixture, is important because the thickness of the tabs and the strip to be welded might vary because they are not cut from the same coil, say; is that correct?

A That's correct.

Q If one were to cut the strips from the same coil,

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to it as such, testing the quality of the weld by forming it afterward, do you know whether that same value is utilized or achieved in the manufacture of metal O-rings?

A It is not.

Q I believe the next thing you discussed was, when you got to the forming of the C in the die, you discussed suppliers again.

Is it Pressure Science's position that the source of supply, say, for tool steel is proprietary?

A Yes.

Q One other question on roll forming before I go on:

Is it your understanding that roll forming, as you described it in your direct testimony, is not used to manufacture other exotic metal seals?

I might have asked you that question.

A Well, I can conceive that the Servo-Flex seal might be made that way. I've never been in anybody else's metal seal factory, you established, okay, so when I look at something I can say there's various ways of doing this. This could be rubber press forming; this could be -- okay. And the Servo-Flex seal could be made that way, I assume. I haven't seen it made, so --

Q If they made it the same way, would the concept be the same?

the rest -- I stated in our shop I could get four cuts out of a die in a couple of hours.

Q I believe you also testified that with respect to the forming operation in the die that has been marked here from Pressure Science, the inside diameter of the slug is unsupported during the forming operation; is that correct?

A The inside surface, yes. That's correct.

Q I believe you also stated that wrinkling is a consideration because of the shape of the C and the stress, which I believe you characterized as compression on the return and expansion in the middle?

A Correct.

Q Is it your testimony that wrinkling is not a problem in other unsupported shapes, when you are trying to form an unsupported shape?

A No. That is not my --

Q So you would agree that wrinkling is a consideration whenever you are forming an unsupported shape in a die?

A Wrinkling is the problem -- is the reason why all of the literature tells you not to form an unsupported shape.

Q So it is a consideration whenever you are thinking about forming something unsupported?

A It's the reason you don't do it.

Q Isn't it true that if you go too far in forming, even with a supported shape, you are going to get wrinkling?

A Yes. Certainly.

Q Mr. Kelly went over a number of exhibits with you --

MR. SULLIVAN: Could I have Exhibits 40, 41 and 42, and 45?

Q If I understand your testimony, with respect to the die that was marked here, it is Pressure Science's claim that the use of a die where you have a top half and a bottom half and a portion of the image is cut in the top and a portion of the image is cut in the bottom is a proprietary concept to Pressure Science in the manufacture of C-rings? Is that correct?

A That's correct.

Q And it is also Pressure Science's position in this litigation that the use of a top half of a die and a bottom half of a die, where you use a center dowel pin, is a concept that is proprietary to Pressure Science?

A That's correct.

THE COURT: In other words -- I want to get this straight -- the concept of using a die, as well as other things, is considered proprietary?

THE WITNESS: The concept of using a die for that type of forming in which you have it unsupported inside.

THE COURT: Right. I am talking about all that.

THE WITNESS: Right. That conceptually is proprietary to Pressure Science.

THE COURT: All right. So, if that is your position, I take it that you consider it proprietary or a trade secret that you are even using a die?

THE WITNESS: Absolutely. Yes, your Honor.

THE COURT: Then you go beyond that, and the type of die and the process used with the concept is also proprietary, because it follows?

THE WITNESS: That's correct, your Honor.

THE COURT: All right.

BY MR. SULLIVAN:

Q I believe his Honor covered it, but the third thing in the die I believe you considered significant is the fact that it is unsupported in the forming operation; is that correct?

A That's correct.

Q Is it fair to say that those are the three principal things you consider to be proprietary?

A It's fair to say that, yes.

THE COURT: What are the three things, now?

MR. SULLIVAN: First is a part of the image cut in the top portion of the die and a part of the image cut in the bottom portion of the die; the second is the use of a center dowel pin to align the top and bottom half; and the third is the fact that the interior portion of the band being formed is unsupported during the forming operation.

THE WITNESS: There's another aspect, Mr. Sullivan, that you left out, and that is the concept of the stop which I described.

BY MR. SULLIVAN:

Q So we would add to that the concept of a stop --

A Right.

Q -- cut into the die --

A Right.

Q -- on both the top and the bottom half?

A That's correct.

Q I believe you testified, with respect to the exhibits that were marked in the deposition, that Mr. Kelly showed you, that he had sent those to you, because you were not at the deposition?

A That's correct.

Q He sent those along with the deposition transcript?

A That's right.

Q I believe you also testified that you read portions of the deposition transcript relating to the dies--

A Right.

Q -- excuse me -- and the exhibits?

A That's right.

Q Let me show you --

THE COURT: I just want to be absolutely correct on this:

So it is your position that, aside from how the die was made, how many parts there were to it and whether there is a dowel or not a dowel and whether it was unsupported or supported, the very concept of using a die to make C-seals is something that you consider proprietary?

THE WITNESS: Absolutely correct, your Honor.

THE COURT: So that if a person walked through your plant and you knew he did not know a hammer from a saw, you would not even want him to know that a die was being used to make C-seals because of the concept of using a die you consider proprietary or not?

THE WITNESS: The concept of -- we would tell somebody that the part would be die-formed. We tell people generally. They say, "How do you make this part?" "It's a combination of roll forming and die forming"; okay. Because when people think of die forming generally for this type of part they think in terms of the type of diagrams which are shown in this technical literature, so we did not believe that the mention of the word "die" would put somebody onto this. You see --

THE COURT: No; explain that to me.

THE WITNESS: Okay.

Usually when a person thinks of a die for metal forming a part with an undercut like this he's thinking about something which has inner support and outer support and clamping blocks and it's in a die shoe, and you are not just going to get near it at less than a couple of thousand dollars, at a minimum. So I always felt secure enough to say we make this thing by a combination of roll and die forming, and use the word d-i-e, die forming. What I didn't want him to know about is how simple this die is. This concept of just, you know, something this simple is what I was seeking to protect.

The term "die" -- "die forming" -- you know, the man knows I didn't cast the part, for instance, because its properties wouldn't be right; and I couldn't have cast it in a foundry. I have to certify what kind of materials I make it out. And he knows, therefore, I've got to start with sheet or strip, because the specification calls for that. So I can't -- he knows it's not a forging. You look at the part; a person could tell that. It's a formed part, and dies is a general class in the forming business. I felt secure about that.

What I didn't want him to know was how simple it is, how straightforward this particular solution is.

THE COURT: All right. Now put it in kind of a concrete example:

If it were only the concept of a die that was being used to make this particular part, and that was in and of itself the secret, in a hypothetical, if someone discovered that, they could go to a person and say "Now we know how they're making this product; they're using a die," and they get a man who knows about dies and he makes it.

But you are saying -- take that example -- you go to a die man and he will scratch his head and say "I don't know how they're using a die to make that product unless it's extremely expensive"?

THE WITNESS: Right. He'll say, "Let's look in the book and we'll find, and here's an example of how you make a die to do that," or "Yes, I know how to make those kind of dies, and here's what you do; you have a cam, you have these sliding wedges to support it"; and particularly if the man knew something about seals, he would know that the wrinkling was really critical, was very important.

THE COURT: What I am really trying to get around to asking you is that if I were in the seal business but I did not know how to make a C-seal, and I learned that you were using a die, but that is all I learned, and I went to my mechanics and said, "Look, the plaintiff is using a die, Pressure Science is using a die," your claim is, even with that knowledge, there is no way they could conceive of this process?

THE WITNESS: I felt secure. When you say "no way," you know -- but I felt secure. I felt that they would not come up with this way of doing it.

THE COURT: And it was your thought that an expert in the field -- what do you call a man that --

THE WITNESS: Tool and diemaker.

THE COURT: -- a tool and diemaker, right -- a tool and diemaker would be stumped as to how you use the die to make that seal?

THE WITNESS: Right.

However, if I came to him and I said Pressure Science is using two pieces --

THE COURT: No, no; that is our next hypothetical.

THE WITNESS: Okay.

THE COURT: I am just talking about going to a tool and die man, saying we learned that Pressure Science is using a die.

THE WITNESS: That's all right.

THE COURT: It is your opinion that he could not come up with how you did it in the ordinary course of his knowledge and experience?

THE WITNESS: That's absolutely correct, your Honor.

THE COURT: Now you are going beyond that. You are saying, well, if he knows what parts of the die or if he ever got hold of our die, well, naturally, he can make it; that is no problem; right?

THE WITNESS: That's correct, your Honor.

THE COURT: All right.

BY MR. SULLIVAN:

Q Does the die that we have marked here as Plaintiff's Exhibit 35 look differently than the other kinds of dies that you just told his Honor you would be expecting a tool and diemaker to come up with?

A Yes.

Q It looks differently?

A Yes.

Q If I show you that, would you be able to tell the difference between this die and the kind of die his Honor was just questioning you about?

A If you held it from that distance from me and didn't tell me what it was, didn't tell me it was a die, just held it over there?

Q Yes, just holding it here.

A I wouldn't be able to -- you know, I wouldn't know what was inside of it. It could be a hydraulic cylinder, I mean.

Q What if I held it like that?

A You couldn't tell what's -- you couldn't tell anything. You would have to examine it.

Q If it were open and you saw it like that, could you tell the kind of die you are using as opposed to the complex kind of die you would expect a tool and diemaker to come up with?

A If it was open like that and it was -- and there was -- I could see what went in and what came out. If I just saw it open like that, you know, I might think of it in terms of some final sizing or some sort of final planishing; but if I saw when it started what the part looked like when it went into that part and what it looked like when it came out, obviously I could go home and make that thing in a minute.

MR. KELLY: Can the record show somehow approximately how far the die is from the witness?

THE COURT: Yes. It is right in front of

him and it is open.

BY MR. SULLIVAN:

Q The kind of dies which you described for his Honor, which I believe in your direct testimony you testified are the typical die--you used the term "die shoe" --

A Yes.

Q What does a die shoe look like? Does it look differently than this?

A Oh, yes.

Q Could you draw one up on the board for me?

A Yes.

What that looks like, actually, is a roller. If that was on a table, I would assume --

Q There is no question pending.

A A die shoe has a base like this, and there's a couple of leader pins. See, it doesn't use the -- it doesn't use the system. It's got a couple of leader pins in the back, and this is the part you die, the die shoe. Then mounted between here --

Q For the record, could you just label that "die shoe"?

A Yes. I drew this in black. "Die shoe." This is the top half; this is the bottom half. That's the bottom of the shoe. These are mandrils, or leader pins I've is there any internal support in that area of that diagram depicted?

A No, as I show right here, see, where I put these cross-hatches.

Q So it is completely unsupported internally in figure B?

A The part is not completely unsupported internally.

Q With respect to your direct testimony, Mr. Sadoff, I believe you also testified concerning the utilization of pulse plates in the manufacturing of C-rings; is that correct?

A That's correct.

Q I believe that you testified that pulse plates were used to accomplish two ends, and the first end was to obtain final sizing; is that correct?

A Yes.

Q And the second was the stress relief; is that correct?

A Yes.

Q Do you know whether pulse plates have been used to obtain final sizing in the manufacture of other exotic metal rings?

A To my knowledge, no.

Q Have you ever tried to find out?

A Have I ever seen it in the literature? No. Have I ever broke into somebody's plant to look? I testified that I have not been in those manufacturing plants which you have proscribed.

Q Okay. So the answer is "no."

Do you know whether the concept of utilizing pulse plates --

THE COURT: There are other ways you can gain knowledge. You can gain it from literature; I think that is an important thing. And you also can gain it by breaking into somebody's plant. But the question, I think, was broader than that, and I would like to know the full answer.

From whatever source, whether at a convention you meet another man in the same field that you are in and you say "Look, how do you get final sizing," and he could say "Pulse plating" -- I mean that is a source of knowledge. From within all your sources, it is your testimony the answer is "no"?

THE WITNESS: I have never seen that before.

THE COURT: All right. Go ahead.

here the material to be used, which is Inconel 750?

A We publish that in our catalog; yes, sir.

Q I did not ask you that question, Mr. Sadoff.

A Yes.

Q Mr. Sadoff, we have gone over, hopefully, in some detail, every aspect of Pressure Science's claims with respect to its manufacture of metal C-rings, and you have testified at length as to each particular method and each particular proprietary claim.

Would it be fair to say, Mr. Sadoff, that if you broke down Pressure Science's claim, every single aspect of Pressure Science's metal C-ring manufacturing process has been used to make another product?

A I don't think it's fair to say that, no.

Q Did you ever tell me that in a deposition?

A Offhand I can't recall. I said I wouldn't be surprised if somewhere in the literature you might not find reference --

Q Let me --

A -- to everything we were doing in terms of, like, for instance, die forming; you could find reference to die forming.

Q Let me refer you to your deposition, again January 10, 1974, page 136, where you said:

"Answer: It would be my judgment, Mr. Sullivan, that every single element of our process, taken individually and broken down individually, has somewhere -- I shouldn't say that, because I don't know whether that's true of the separate tabs -- but most of the things which I've been testifying to as to what we consider proprietary have been used. Those elements have been used in the manufacture of other products."

Was that true then?

A That was my opinion then.

Q Is that true today? Yes or no, if you can answer it.

A I would feel about that today that --

Q Can you answer that yes or no?

A I'd say no, based on additional research.

Q I believe the only qualification you had in there was the use of separate tabs; and, if I recall your testimony last week, you did at some point indicate that the concept of using separate tabs is not proprietary to Pressure Science, just that concept alone?

A I stated it was shown in the literature for tubing.

Q Didn't you also follow that by saying that the concept of using separate tabs to weld strip in and of itself month when I was unemployed I worked as a commission salesman for the Grolier Corporation, selling encyclopedias.

Q Was that in an executive capacity or door to door?

A That was in door-to-door capacity.

Q Was that on only one occasion?

A It was for that one period of time, and that's all.

Q You never had a similar job in any other period?

A As far as I can recall, no.

Q So now you have detailed for us your entire employment from the time you graduated from MIT until the day you got your job at PSI?

A I was also in the U. S. Army for a six-month period.

Q It is true, isn't it, Mr. Sadoff, that of the prior jobs -- and I am excluding the -- did you say Grolier?

A Grolier Corporation. It's a large manufacturer. They publish the Grolier Encyclopedia, The Children's Book of Knowledge.

Q With the exception of that and Daystar, all your prior jobs had to do with companies in metal working; is that so?

A Except -- that's not completely correct, because of the -- the job I had at Atlantic Research Corporation as manager of new product market development entailed several other types of businesses, such as plastic pipe fittings, for instance.

Q It is true, isn't it, that Kopper and Marman Division of Aeroquip involved aircraft metal parts?

A Yes, sir.

Q Did that include seals, by the way?

A I so testified.

Q I cannot hear you.

A I so testified.

Q Did any of these prior employers consider any information having to do with these metal products, aircraft metal products, proprietary?

A Yes.

Q Were any of these products about which some aspect was considered proprietary made for the same application as products made by Pressure Science?

A The Aeroquip manufactured --

Q Is the answer to that "yes"?

A Yes.

Q Okay. What?

A Aeroquip manufactures V-band couplings, and we manufacture V-flange couplings, and there are applications where a customer might consider ours or theirs.

Q Is that the sole product that fits the description

I just gave you?

A Well, not -- no.

Q Yes or no?

A No.

Q No?

A No.

Q What other products?

A In 1959 the Koppers Company --

Q What products, Mr. Sadoff?

A Metal seals.

Q What kind of seals?

A Static metallic seals.

Q Made --

MR. KELLY: Your Honor, I am going to object to the further line. I do not see the relevancy of this line to what has been testified on his direct examination. He is talking about other products that do not seem to be related to metal seals. I do not know where we are going.

MR. LaPRÁDE: Your Honor, the witness testified at length on direct as an expert, presumably based on past experience. Secondly, he testified as to his knowledge or lack thereof of certain types of manufacturing techniques related to those presently employed at PSI that would seem to me to be relevant to both, and now the witness has just described the manufacture of a static metal seal.

THE COURT: Objection is overruled.

BY MR. LaPRADE:

Q Do you recall the question, Mr. Sadoff?

A No, I do not.

(The record was read by the reporter as above recorded.)

Q Who made these?

A Koppers, Incorporated.

Q These seals could be used in the same application as a PSI product made by your company?

A Yes.

Q Koppers considered some aspect of those seals proprietary; is that correct?

A Not -- I'm trying to think of an aspect of it that they would have considered proprietary, and I can't think of it offhand.

Q Putting aside for the moment a product that could be used for the same application as a PSI product, regardless of what the product was made by a prior employer, were any of the manufacturing techniques employed to make that product relevant to manufacturing techniques used by your company today, by your present company?

A I don't believe so, no.

Q It is true, isn't it, that Marman does compete with Pressure Science with regard to all three products that Pressure Science makes, flanges, seals and couplings? Is that true?

A That's correct.

Q Does Marman consider anything about any of these products proprietary?

A Yes.

Q What?

A The detailed dimensions of the flange, the Conoseal flange, that is used in connection with their joints.

Q Is that the sole thing that they consider proprietary?

A Yes.

They may also consider the manufacturing method on the C-seal proprietary. I'm not certain of that, but I wouldn't discuss that with anybody.

Q You would not?

A No.

Q Is that the way that you insure that you will never use the proprietary information of a prior employer?

Q A little bit on plant security.

I think you testified that there was a problem with uninvited visitors during Mr. Kramer's tenure at PSI; is that right?

A That's correct.

Q Was there a visitor's register at PSI?

A No, there was not.

Q Were there posters up for the employees similar to those you see in a military installation, warning them about divulging secrets?

A No, there was not.

Q You testified there were five customers whom you could recall had visited Pressure Science during the seven years you were there. They were Rolls Royce, Pontiac Division of GM, Country of Israel, Brookhaven Lab and NASA, National Aeronautics & Research Organization?

A Yes.

Q Did Williams Research ever visit PSI?

A Yes.

Q They are a customer?

A They were. They were a potential customer. You are right. That one slipped my mind.

Q Grumman Aircraft?

A No, I was talking about design engineer people good at that.

A I'd say that's probably about fifteen feet.

Q So you are saying fifteen feet is the closest that a --

A Give or take, abouts, yes; that's what I'm saying.

Q -- touring visitor could see C manufacture and using the die, could they not?

A Yes.

Q And the same process would be visible from the window, would it not, the window as it existed in Mr. Kramer's time?

A Well, since the press was up against the wall and the windows were on either side of the press, I'm not sure that you could see in at that angle and actually see it, but you might.

Q Were visitors told that the process was proprietary?

A Yes.

Q I believe you testified in response to some questions of Mr. Sullivan that only the people in the C-seal area were familiar with the process used to make metal C-rings; isn't that right?

A I don't recall that I may have testified --

Q Is that true?

A Only the people in the C-seal area? It's a little too restrictive.

Q It is true, isn't it, that people in the machine shop would have known about making dies, how to polish, how to heat treat?

A Some would and some wouldn't. It would depend on who you were talking about. We had various levels of skill. Some of the people in the machine shop were capable of making the dies.

Q So some of the process that you consider proprietary took place outside the C-ring area proper; is that right?

A Yes.

MR. LaPRADE: Your Honor, this is a seven-page document delivered pursuant to discovery, listing the names of former Pressure Science employees.

THE COURT: Any objection?

MR. KELLY: Yes, your Honor, on the ground it is irrelevant.

THE COURT: What relevance would this have?

MR. LaPRADE: Your Honor, this witness testified we are concerned here with a very, very simple concept, the enunciation of which would cause other people to go into the industry. The

* * * * *

EXCERPTS FROM THE TESTIMONY OF DUDLEY D. TAYLOR

DUDLEY D. TAYLOR, called as a witness by the plaintiff, being first duly sworn, testified as follows: that he is president of the plaintiff, which he founded in 1958 or 1959 [657]; that he has a bachelor's degree and master's degree from the University of Maryland in mechanical engineering and is a licensed professional engineer [658]; that he holds about ten patents [660]; and that he was employed at the Naval Ordinance Laboratory as an engineer for eleven years prior to his departure to organize the plaintiff [662-63]. Mr. Taylor further testified in part as follows:

* * * * *

THE COURT: Then what happens?

THE WITNESS: She puts the top half on, slides it under the press, pushes the buttons. The press closes, comes down, pushes on the die, closes completely. She then takes it off and may or may not remove the pin, and then removes the finished seal and puts the next one in and forms it.

THE COURT: Okay. So that is done by hand, the removal and the putting --

THE WITNESS: Yes, that really is the key thing. We don't have -- the quantity of the runs for manufacturing seals are relatively small compared to other metal forming operations. We have to be able to cope with a ten-piece order. It is very, very seldom that we ever see a thousand-piece order. We do, but they're not the run of the mill. I'd say an average order for seals is fifty pieces.

THE COURT: All right, thank you.

You may continue.

BY MR. KELLY:

Q Mr. Taylor, if I understand correctly, we have gone through essentially, in your testimony this morning, the

A I don't believe so.

Q How big is your present staff at Pressure Science?

A Our total employment is approximately ninety.

Q I think Mr. Sadoff testified that there were only fifteen or twenty people there when he arrived in 1968; is that correct?

A Yes.

Q So is it true that over the course of time you have had a fairly recent rapid expansion of staff? Can we agree on that?

A We have had a consistent growth rate, yes.

Q And over the second half of the life of the company it has been much more rapid than in the first half? Can we agree on that?

A No.

Q Do you recall Exhibit C --

MR. LaPRADE: Could I have Exhibit C?

Q -- which is a document which reflects the number of W-2 forms produced per employee at Pressure Science? Do you recall that exhibit?

A I know that we got W-2 forms.

Q Isn't it true that the turnover rate for each of the three years depicted on there is in the neighborhood of a hundred percent?

A May I see the document, please?

Q Yes, you may.

A Yes, this includes part-time people -- everyone, every occasional employee.

Q But including everybody, you have about a hundred percent turnover for each of the three years indicated?

A Yes.

Q Do you recall the exhibit which indicates names of former PSI employees? Do you recall that exhibit?

A I believe, yes.

Q If you will take my word for the moment that there are 383 names on there, that would mean that PSI has had a total number of employees, past and present, of about 470; would that be about right?

A Yes.

Q At about the same time or approximately a year after you hired Mr. Halling, you hired a Mr. Miles; did you not?

A Yes.

Q He also came from Avica; did he not?

A No, not directly. He had worked in Canada for two years prior to coming to Pressure Science.

Q He was a prior Avica employee?

A He was a prior Avica employee.

a personal pride standpoint as well; isn't it, Mr. Taylor?

A It's important because of the jobs of people that are at stake.

Q And that is all?

A That's the most important thing.

MR. LaPRADE: May I have a moment, your Honor?

THE COURT: Certainly.

MR. LaPRADE: I have nothing further, your Honor.

THE COURT: All right. Mr. Sullivan.

CROSS-EXAMINATION

BY MR. SULLIVAN:

Q Mr. Taylor, I am going to ask you a number of questions concerning procedures at Pressure Science, and they all relate to the time period from the inception of Pressure Science up to the time I took your deposition, which was January 17th and 18th, I believe, 1974. Okay?

A Okay, from the beginning.

Q If things have changed since then, do not reflect that in your answer.

As of January 1974, how many employees did Pressure Science have, approximately?

A 71 or '2.

Q Is it fair to say that some of those employees were familiar with PSI's entire metal C-ring manufacturing process?

A Yes.

Q Is it also fair to say that some of PSI's employees were familiar with portions of that manufacturing process but something less than all of it?

A Yes.

Q Is it fair to say that with respect to all of PSI's employees, whether they were familiar with some or all, all those employees were not told that the entire body of proprietary information claimed by PSI was confidential?

A Okay. All employees were told all things were secret.

Q Whatever they learned?

A Was that?

Q That is correct.

A Is that your question?

Q That is right.

A All employees told all things were secret? No.

Q So it is fair to say that certain of the Pressure Science employees are not advised that a particular portion of the process is not confidential -- or is confidential?

A They are not told in detail.

Q Are they told at all?

A They are told that our products --

Q Wait a minute. Can you answer me that? Are they told at all?

A Are they told at all?

Q Are all your employees told that the entire process is confidential? I believe you answered that question "no." My next question to you was are there some employees that are not told that certain portions of the process are confidential.

A There are certain employees that are not specifically told that various portions are confidential.

Q Is it also fair to say --

THE COURT: I missed something. Would you read back four or five questions back.

(The portion of the record referred to was read by the reporter as above recorded.)

THE COURT: That is what I thought. That is what I made a note of.

Go ahead.

BY MR. SULLIVAN:

Q Isthat your testimony? I thought you said something different.

A I am thoroughly confused.

Q Okay. Let me ask you the question again.

Isn't it true that all the Pressure Science employees are not advised that the entire process that they are exposed to at Pressure Science is confidential?

THE COURT: You see, you have a "not" in there, and that is what is -- "Isn't it true," and then there is a negative.

What do you tell your employees about the confidentiality of the processes?

THE WITNESS: When they're brought in, in general they are told that the product is manufactured -- that C-seals manufactured at Pressure Science is the only one that's manufactured by these techniques in the United States. We do not necessarily go down with each employee and tell them specifically each one of the nine things --

THE COURT: I did not ask you what you did not tell them.

THE WITNESS: I'm sorry.

THE COURT: What did you tell them?

THE WITNESS: We tell them that this is the only place in the United States where C-seal is manufactured that we do consider the process proprietary.

THE COURT: You tell that to all your employees?

THE WITNESS: Yes.

THE COURT: All right, that is what I thought he said earlier.

BY MR. SULLIVAN:

Q Let me refer you to your deposition, page 212, starting with the question on the bottom:

"Answer: 70.

At that point you had identified for me the fact that you had seventy employees.

"Question: You, personally, or anybody pursuant to your directions? You run the company; right?"

And you can read the answers.

A "Right."

Q "Question: Told those employees that the nine steps we went over here today and last week were proprietary?"

A "We have never told all the employees that nine items are proprietary."

Q "All nine items?" Is that in there?

A "All nine items," yes.

Q "Question: Have you at some point told various employees that various items are proprietary but covered all nine items with various employees?"

A "To the best of my knowledge, certain employees have been informed that all nine of these items are considered proprietary."

Q "Question: But not all of them?"

A "But not all the employees"; but not all of them, yes.

Q Isn't it also true, Mr. Taylor, that certain of your employees at Pressure Science are more knowledgeable about the process --

A Yes.

Q -- and certain employees have an over-all understanding of what the process is with respect to your metal C-ring manufacture?

A Yes.

Q Let me show you an exhibit that was marked at a deposition in this case and ask you if you recognize it.

A This is a list of employees.

Q Do you recognize the exhibit?

A It does not have a title on it. I do not know -- I have a list of employees. It says age and length of service.

Q Do you know where this document came from?

A I do not know what basis this information was collected.

Q I will tell you where I got it from. I got it from your counsel, and it purports, as I understand it, to set forth, at least at the point I took your deposition, the present Pressure Science employees.

A All right.

Q Does it look like it is that to you?

A I don't have a count of them. That's 44? It doesn't -- that would not be the correct count.

Q How much is it off by?

A Well, this says thirty. I assume that thirty is the total of that column, fourteen there and four, so you are looking at 48, and I testified we had seventy, and I believe seventy was the correct --

Q Do you know what category of employees are left off the exhibit?

A No, sir.

Q Does it look to you like you have your supervisory employees listed in this exhibit?

A This -- yes. It's a list of supervisory employees. I don't know whether that's all or --

MR. SULLIVAN: Okay. I would like to have this marked if there is no objection.

THE COURT: Exhibit what?

THE CLERK: M, your Honor.

THE COURT: Is this a list of supervisory personnel at the plaintiff's plant as of what date, Mr. Sullivan?

MR. SULLIVAN: I believe it would be the date of the deposition, your Honor, which I will have to get.

MR. KELLY: Your Honor, I do not believe there is a proper foundation for it. I do not think it is a list of supervisory personnel.

THE COURT: What questions do I address to counsel to obtain that list?

MR. SULLIVAN: If you will just hold on a minute, Mr. LaPrade actually -- your Honor, I do not have the particular request in front of me, but I believe it was produced in response to a request by Mr. LaPrade, and the request was to provide us with a list of the supervisory employees at Pressure Science.

If My understanding is incorrect --

THE COURT: As of a certain date?

MR. SULLIVAN: Yes, your Honor. I believe it was December of 1974.

If my understanding is incorrect, I will stand corrected. If Mr. Kelly recalls --

MR. KELLY: Your Honor, I do not recall. I would simply suggest that subject to some confirmation on the foundation of this, if he wants to examine on it, fine; we have no objection. It was provided pursuant to a request. I do not remember what the request was, but I think that counsel should establish that at some point.

THE COURT: All right, let's see what the witness knows about it.

BY MR. SULLIVAN:

Q Looking down that list, would you identify for me the employees on that list that would have had knowledge of PSI's proprietary process in its entirety?

THE COURT: With respect to the C-seal?

MR. SULLIVAN: Yes, your Honor.

A I'd say that there's the order of ten to twelve people on the list.

Q Would you identify them for me, please, going down the list?

A I would -- I will identify to the best of my ability. There may be some that I will omit or not list. Okay.

B. J. Sadoff -- oh, start off with myself, D.

Taylor.

Going down the left column:
B. Sadoff;
H. Halling;
Mr. Bojanowsky;
Mr. Presley;
Mr. Miles;
Mr. Houck;
Mr. Darden;
Mr. Rideout;
Mr. Dougherty;
Mr. Schossler;
Mr. Hernandez.

That's essentially the list. My definition --

Q Okay, that is the list.

With respect to the twelve employees that appear on this list and that you have just identified, would you list for me those employees on that list that had executed a nondisclosure agreement?

A Mr. Taylor; Mr. Sadoff; Mr. Halling; Mr. Bojanowsky.

I believe that's it.

MR. KELLY: Excuse me, your Honor. I am not clear about one thing. Are we still talking about the time frame up until 1974?

MR. SULLIVAN: Yes, and I believe the witness understood that.

THE WITNESS: Yes.

BY MR. SULLIVAN:

Q With respect to the remaining employees that were familiar with Pressure Science metal C-ring process in its entirety and had not executed a nondisclosure agreement, was there any routine when you brought those employees into the company whereby you would call them into your office and tell them what they were about to learn was proprietary?

A It doesn't appear in that formal procedure. I'm in contact with them daily.

Q Is the answer to the question "No, there is no particular routine"?

A I did not sit them down in the office and list in a solid way -- no.

Q So, if I understand your testimony, then, when these new employees came in there was no routine at Pressure Science to take a new employee into your office, sit him down and say, "Look, what you are about to learn here is proprietary"?

A That is correct.

Q Is there any piece of paper at Pressure Science which indicates that any of the employees that did not execute a nonedisclosure agreement were advised that the process was proprietary?

A No.

Q I believe in response to one of Mr. Kelly's questions you said that you recall asking David Kramer to sign a nondisclosure agreement; you recall that?

A Yes.

Q I believe the next thing you said after that was you recall that because it was your procedure to give key employees this form to sign; you recall that?

A Yes.

Q What is a key employee?

A They're all key. But the level that Mr. Kramer was being hired for was that of a -- the second or third line manager in the company. He would report to me. He was going to be responsible for fifty people. That certainly is different than a man out on the floor.

Q Okay.

A And that's what I said. I thought that I had -- or -- given him the form and requested his signature. But I may not have.

Q I am confused. I thought you meant a key employee to mean one who would have a lot of knowledge of the metal C-ring proprietary process. You did not mean it in that sense?

A No. That kind of responsibility.

Q So the people that we identified earlier that had not signed a nondisclosure agreement -- they are not key employees?

A They are key employees.

Q Assuming they are key employees, is it your testimony that those key employees were also given nondisclosure agreements to sign?

A No.

Q So, if I understand your testimony now, Mr. Kramer was only one of a number of key employees, and he was the only key employee that was asked to sign a nondisclosure agreement, other than Miles, yourself and Sadoff; is that correct?

A Halling, Sadoff and myself.

Q Okay. With that correction, is that correct?

A Can you repeat the question, please?

Q I believe you have told me that you, Mr. Sadoff and Mr. Halling signed nondisclosure agreements. I believe you have also testified that the persons that we identified in this exhibit, the other nine persons, would fall within your description of a key employee?

A Yes.

Q And I believe you also testified that it was your procedure to give key employees the nondisclosure agreement to sign; is that correct?

A Yes.

Q Is it your testimony that you asked the other nine people on this list --

A No.

Q -- to sign a nondisclosure agreement?

A No.

Q Maybe I am missing something, Mr. Taylor. But why would it call to your attention the fact that you gave Mr. Kramer a nondisclosure agreement to sign if it was not your practice to give key employees nondisclosure agreements to sign? Maybe I am thick, but --

A Okay. I believe -- and I could be wrong in what I think I recalled I said yesterday --

Q You know what we are doing here is terribly important --

THE COURT: Just a minute, Mr. Sullivan. You asked the man why. Let him answer.

Why do you recall the Kramer situation so well and not the others?

THE WITNESS: All right. Mr. Kramer was assuming a position of very wide-range responsibility, and I believe that I testified yesterday that I think that I gave him and asked him to sign it, and I did not positively testify that I did. I believe that I did.

BY MR. SULLIVAN:

Q Okay. But it certainly would not trigger in your mind the fact that you did or did not give him a nondisclosure agreement, the fact that you "had a procedure to give key employees this form," because you had no such procedure; right?

A Yes, we do. We have the -- the key employees that are on the list are -- certainly do not have the level of responsibility that Mr. Kramer was assuming.

Q Okay. I lost you again, because I thought you agreed with me earlier, when we identified the twelve people on this list, that they were key employees.

A And I said everybody is a key employee.

Q That is not what you told me earlier. Didn't you tell me that of these twelve people they were key because they had wide knowledge of PSI's entire metal C-ring manufacturing process?

THE COURT: You see, that is a slightly different question. You asked him, I believe -- and the record will speak for itself -- what people on that list had knowledge of the entire process, and he named twelve.

MR. SULLIVAN: That is correct, your Honor.

THE COURT: Now, when you asked him how many key employees does he have, he said everyone.

MR. SULLIVAN: Your Honor, I could be wrong --

THE COURT: Let's not get into colloquy.

Is that the twelve people you named, that they had knowledge of the entire C-seal process?

THE WITNESS: Correct.

THE COURT: And that is when you named the twelve? Is that right?

THE WITNESS: Yes.

THE COURT: All right.

MR. SULLIVAN: Your Honor, I believe I also thereafter asked him if he would characterize these twelve people as key employees.

THE COURT: Yes. That does not necessarily not follow. All key employees are all employees in the plant. All employees in the plant do not have knowledge of all the C-seal business. Some of the key employees do. There is your syllogism; there is your logical progression. There is nothing inconsistent.

MR. SULLIVAN: Let me just pursue it one step further.

THE COURT: All right.

MR. SULLIVAN: I believe there is, your Honor.

THE COURT: All right, go ahead.

BY MR. SULLIVAN:

Q Didn't you testify that the reason that you thought you recalled asking Mr. Kramer to sign this was that you had a procedure to give employees the nondisclosure agreement to sign?

A And here again is the word -- is the word "key," and I said at the level of responsibility for the job Mr. Kramer was assuming, he was a key key employee --

Q There are key employees --

A -- who is a super key employee.

Q There are key key employees and there are other employees that are not so key?

A Okay.

Q And it has nothing to do with how much they know about the metal C-ring manufacturing process that causes you to distinguish between some key employees and other key employees; is that correct?

A Yes.

Q Isn't it also true that when David Kramer was fired by Pressure Science he was not asked to sign a nondisclosure agreement at that time?

A Correct.

Q Is it also true that there was not any consideration at that time given by you or anybody else at Pressure Science about having him sign a nondisclosure agreement?

A Correct.

Q And that was the case even though at that point in time it was your understanding that Mr. Kramer had visited Advanced Products a few weeks before?

A That --

Q Well --

A I just didn't believe he was there.

Q I did not ask you that.

A Okay. I'm sorry.

Q And that was the case also even though at that point in time you had found out or satisfied to the best of your knowledge that Mr. Kramer was not who he purported to be?

A True.

MR. SULLIVAN: Can I have Exhibit 7?

Q Do you recall a fellow by the name of Phillips,

A Yes.

Q Can you tell me how you can claim in that ad, therefore, that C-seals, "the original pressure-energized metallic seal" -- they were not the original; were they?

A The C-seal -- yes, they were. The basic C-seal was disclosed in a French patent in 1900.

Q Is it your understanding that the C-seal therefore was the first pressure-energized metallic seal that was sold?

A If it wasn't the first, it's one of the first.

Q You say "original" here. Do you know whether it was the original or don't you know whether it was the original?

A To the best of my knowledge, it was the original.

Q Did you have anything to do with that French patent?

A No.

Q There was testimony when Mr. Sadoff was on the stand about the physical locations of the windows in the rear portion of the manufacturing area allocated to C-seals at your plant; do you recall that?

A Yes.

Q Could you describe for me those windows, just how big they are and --

A The two rear windows in the seal manufacturing area were approximately three feet by four feet, were made of glass.

Q Is it possible for somebody looking through those windows to have an uninterrupted view of your C-ring manufacturing area?

A I do not believe it's possible to have an uninterrupted view.

Q Do you recall that you told me that in your deposition?

A No.

Q Let me refer you to page 249, top question:

"Is it possible for somebody looking through those windows to have an uninterrupted view of your C-seal manufacture?"

A I'm sorry, I do not have that particular page up here. Youwill have to read it for me.

Q "Answer: If a person's back there watching the C-seal production, it would be difficult for them to see the details of the operation. The distances are such and the sizes at what they would be looking at, they would have to have binoculars.

"Question: Could they tell you were using a matched metal die to form C's?

"Answer: They might.

"Question: They would see them right there on the table; wouldn't they?

"Answer: They might see the die and they might see the rollers."

You recall that testimony?

A Yes.

Q Was that correct then?

A But that's not an uninterrupted view, Mr. Sullivan.

THE COURT: The question is was it correct then.

THE WITNESS: Yes.

THE COURT: Is it correct now?

THE WITNESS: No.

BY MR. SULLIVAN:

Q It is not correct now?

A The windows have been removed.

Q That is all that has been done since I took your deposition; correct?

A No. It was done in September, before you took the deposition.

Q I see.

A Okay.

Q In any event, the windows were like that when David Kramer was an employee?

A Yes. They shone out on the woods.

Q Mr. Taylor, do you recall Mr. Sadoff's testimony about a Rolls Royce tour that was conducted at Pressure Science?

A A tour of people from Rolls Royce?

Q Yes, sir.

A Yes.

Q Do you recall that Mr. Sadoff said that that was a typical tour conducted?

A No, I don't recall the word "typical."

Q My recollection of his testimony was that he said it was typical of a customer tour. Would you disagree with that?

A No.

Q And I believe he went on and said it was typical in the sense that you show them something but they learn nothing; is that correct?

A Correct.

Q That is what the effort is designed to accomplish.

I believe he also said that before a typical tour like this was conducted, the customers were told that what they are about to see was proprietary and they were not to reveal it; do you recall that?

A I'm sorry, you lost me. Would you repeat that, please?

Q I believe that Mr. Sadoff then said that the customers, prior to being taken on this typical tour, would be told that what they are about to see is proprietary and they were not to reveal it; do you recall that?

A I recall that.

Q And I believe Mr. Sadoff made specific reference in his testimony to a tour for Brookhaven and to a tour for a company from Geneva, CERN; do you recall that?

A I believe concerning the company CERN Mr. Sadoff testified that he was not in our employ when that --

Q He referred to CERN, though; did he not?

A He referred to CERN, yes.

Q And he did make specific reference to the Brookhaven tour?

A Yes.

Q Is it your testimony that prior to the CERN and Brookhaven tours those customers were told that what they saw with respect to C-ring manufacture was to be considered proprietary and not to be revealed to anybody else?

A I believe so. Yes.

Q Would you refer to your deposition?

A I'm missing page 235 to 283.

Q Here, I will give you my copy. It is in the first volume.

A May I have the page, please?

Q Yes, page 233, the top of the page.

"Question: What's the name of that plant?"

A "CERN."

Q "Whereabouts?„

A "In Geneva, Switzerland. He was in the plant on the shop floor with me in the inspection area. He is a customer."

Q "Was he knowledgeable?"

A "Yes."

Q "He could have understood what he saw?"

A "Yes, but again he didn't really see the total operation."

Q "Do you recall whether he saw die forming?"

A "This was a stretch form part we were working on for him, and that was, you know, the particular problem, that part."

Q "What else did he see; do you recall?"

A "Stretch forming and inspection. We had an inspection problem."

Q "Anybody else you can recall, Mr. Taylor?"

A "That's all I can remember entering the manufacturing area. Other customers had been in the plant and in the office area."

Q "Do you recall the name of the fellow from the European company that came in?"

A "No, but I can get that for you."

Q "I'd like to have it. How about the fellow from Brookhaven? You recall his name?"

A "Schukman."

Q "Prior to taking these people on these tours, did you advise them that whatever they saw with respect to your C-ring manufacture was to be considered proprietary and not revealed to anybody else?"

A "No."

Q "You never told 'em that?"

A "No."

Q "So whatever they saw they saw?"

A "Right."

Q "And some of these people were knowledgeable and could have figured out what you were doing?"

A "And those people were not --"

Q "Question: Is that correct?"

A "Some of them were knowledgeable, yes."

Q "Question: And I take it you never asked them to sign a nondisclosure agreement?"

A "That is correct."

Q As I understand it, Mr. Taylor, Pressure Science has never applied for a manufacturing patent in connection with the C-ring; is that correct?

A That is correct.

Q Did you ever give it any thought?

A No.

Q Did you ever consult a lawyer about whether it could be patented or not?

A I don't believe so.

Q Did you ever receive any advice from anybody, lawyer or otherwise, that you were better off not patenting it, relying on other methods of protection?

A Not that I can recall.

Q Were you interested in protecting your process?

A Yes.

Q How did you think you would protect it?

A Within my own house, within the shop, within our plant. That's why we never sent dies or tooling out to be made someplace else.

Q Do I understand your testimony, Mr. Taylor, that you made a value judgment that you would be better off relying on trade secret protection as opposed to patent protection?

A I don't believe that I made a conscious decision one way or the other.

Q You did not give it any thought one way or the other?

A I really don't know.

Q Did you know anything about trade secret protection when you were thinking about this or not thinking about it?

A A little. I read generally the value of trade secrets, having within your plant people that are in your employ shouldn't use their knowledge that they have derived from your plant to destroy you with.

Q Do you recall that I asked you in your deposition whether you knew anything about trade secret law and you responded "No"?

A Probably. I'm not a lawyer.

Q Isn't it true that you did not seek patent protection because you thought the art was very close?

A Possibly, yes.

Q I believe there was some testimony about the policy of Pressure Science not permitting drawings and tooling used in C-ring manufacture from leaving the plant; do you recall that?

A Yes.

Q Is that Pressure Science's policy?

A Yes.

Q Is that policy one that appears in writing any place in your plant?

A I don't believe so.

Q So there are no written rules one way or the other?

A No. I sign all purchase orders.

Q With respect to the steps that Pressure Science uses to manufacture metal C-rings, do you know whether any of those steps are also used to manufacture metal O-rings?

A Exactly?

Q Similar steps, exact steps or not; similar, if you can answer the question.

A I don't believe that any of the processes are exactly used for manufacture of metal O-rings.

Q How about if we reduce it to similar steps?

A Similar steps? All right. Packaging. They package seals; we package seals.

Q Anything else?

A Plating. They plate, electroplate; we electroplate.

Q Anything else?

A That's probably about it.

Q Do you know if any of the steps used to manufacture metal C-rings are used to make other metal seals, not just O-rings?

A I know of none.

Q Do you know whether any of the steps used by Pressure Science to manufacture C-rings are used in any other industry?

A I know of none.

Q So I take that to mean it is your testimony that those steps are not used, to the best of your knowledge, to manufacture products in other industries or other metal seals; is that correct?

A That is correct.

Q Let me refer to your deposition, page 106, middle of the page.

"Now, with respect to the nine steps that we have listed here, do you know whether any of those nine steps are utilized in the manufacture of O-rings?"

A "No, sir."

Q "You have no knowledge of that?"

A "No, sir."

Q "Do you know whether any of those nine steps are utilized in the manufacture of metal seals other than C-seals?"

A "No, I don't."

Q Have you learned something between the time I asked you those questions and the time I just asked you these other questions?

A Since you asked me those questions I have seen a die used by Advanced Products, the pictures of the welding fixture, the plating rack used to electroplate C-seals --

Q I do not think that was my question, Mr. Taylor.

A You asked me if I have learned something, and I am telling you what it was.

Q Learn something that would change your answer there?

A Yes, that's what I've learned.

Q Has your survey of metal seal industry generally increased since the time I took your deposition? Do you know anything more about it now than you did then?

A Now wait a minute. "Utilized in the manufacture of metal O-rings" was the condition on your question --

Q Right.

A -- and what nine steps that Pressure Science has is being used by Advanced Products in the manufacture of metal O-rings. That's what we're talking about. We're not talking about industrywide, as the way you understand it.

Q I believe the next question dealt with metal seals; isn't that correct?

A All right, "Do you know" -- okay, now you are talking other metal seals. I still do not know of anyone using our techniques to manufacture any other metal seal, even today.

Q Prior to the institution of this suit did you undertake any special effort to ascertain how other metal seal manufacturers were manufacturing their products?

A Based on --

Q Can you just answer that.

A My whole life.

Q Did you make special efforts?

A Continually.

Q Your testimony is you made special efforts before you brought this suit to determine whether or not the steps that PSI uses to manufacture metal C-rings were being used by other metallic seal manufacturers; is that your testimony?

A I continually monitor the methods employed by other metal seal manufacturers, all available information.

Q ✓ [Mr. Sullivan reading from the Taylor deposition.] 108:

> "So I take it from your answer you didn't make any effort prior to the institution of this suit with respect to this lawsuit to ascertain whether any of the nine steps were being utilized by companies other than Pressure Science in metal seal manufacture?"

A "No special effort was taken."

THE COURT: What nine steps are we talking about? Are they listed in your brief?

MR. SULLIVAN: Your Honor, they are the steps that appear on the illustration that was initially marked here by me. They generally cover the entire proprietary claim of Pressure Science. Advanced Products Exhibit A sets forth the nine steps.

THE COURT: Is it your claim that no one of those nine steps is used, to your knowledge, by anyone in the seal business?

THE WITNESS: That is correct.

THE COURT: I thought you said at least two, perhaps, are electroplating and packaging. Are electroplating and packaging on Exhibit A?

MR. SULLIVAN: Yes, your Honor. I have Exhibit A here if you would like to make reference to it.

THE COURT: Is packaging on there?

MR. SULLIVAN: Yes, your Honor. 8.

THE WITNESS: 5 for plated.

THE COURT: So your answer is except for 5 and 8, to your knowledge, no one else uses any one of those steps on Exhibit A?

THE WITNESS: I believe that that is correct, yes.

Now, as far as electroplating, the O-ring manufacturers do electroplate, but they're plating an O-ring instead of a C-seal and use different fixtures to accomplish their plating operation.

THE COURT: Is this answer based on what you have learned since January 1974, or did you have this knowledge before January 1974?

THE WITNESS: Before.

THE COURT: See, I thought you answered in your deposition -- I may be wrong -- that you really had no knowledge as to how they make O-rings.

Would you read that back to me?

MR. SULLIVAN: Yes, your Honor.

THE WITNESS: 106.

THE COURT: You see, the question that comes to my mind is, if you had no knowledge how they make a product, how are you able to say they were not using these processes? But maybe you did not say that, so let me check.

MR. SULLIVAN: Yes. "Now, with respect to the nine steps we have listed here, do you know whether any of those nine steps are utilized in the manufacture of O-rings?

"Answer: No, sir.

"Question: You have no knowledge of that?

"Answer: No, sir."

THE COURT: But now you do have knowledge; is that it?

THE WITNESS: All right. You know, I have from my own reading knowledge as -- generally how they make a metal O-ring. I have never seen it done in detail. They generally take a length of tube and form it and weld it, roll it into a circle and then weld it. I know they don't die form it. I know they don't mash the weld.

THE COURT: Did you know Advanced Products was in the O-ring business?

THE WITNESS: Yes.

THE COURT: Would you explain to me again, because this might be an appropriate time, why you were not more concerned -- I'd better leave out the "why," because I do n-t want to get objectionable answers in -- but Mr. Kramer was in your employ in April 1973 --

the source of material, be it text or drawings, that go into any of these --

THE WITNESS: They're all cuts from our catalog. If you match them up, you will be able to see the match between our catalog and theirs.

THE COURT: But the text does not come from your catalog?

THE WITNESS: Some portions of it.

THE COURT: Who decides that?

THE WITNESS: They decide what they'd like to put in their own -- in the catalog.

THE COURT: You may proceed.

MR. SULLIVAN: Thank you, your Honor.

BY MR. SULLIVAN:

Q Mr. Taylor, I believe in response to one of his Honor's questions you indicated that if you pick up a metal seal you can tell by looking at it whether it was machined or die-formed; is that correct?

A I believe so.

Q Would you also be able to tell whether it was machined or roll-formed, by looking at it?

A I believe so.

Q I believe you have told the Court at some point that there are only two formed seals that you know of, the

C-seal and the Parker Mark II?

A Yes.

Q When you use the term "formed," you mean either die-formed or roll-formed?

A Yes.

Q Have you ever heard of the Conoseal?

A Yes.

Q Do you know whether that is machined or formed?

A From my examination of the final product, I'd have to say it is both machined and formed.

Q So you were inaccurate to the extent that you left out the Conoseal; is that correct?

A Well, that's machined --

Q But it is also formed; right?

A It's also machined.

Q Were you inaccurate when you said the only two seals you knew that were formed were a C and a Parker Mark II?

A I think I was incomplete.

Q Did you ever hear of a seal by the name of Corruseal?

A Yes.

Q Corruplus?

A Yes.

Q Do you know how they are made, whether they are machined or formed?

A They are essentially manufactured using punching operation and then put into a die and coined, in a male and female die.

Q So they are formed also; right?

A I believe in that statement that the Court asked me at that time --

Q I am not --

A -- was a self-energized type of seal.

Q I do not believe so. My notes indicate that you told the Court you only knew of two formed seals, the C and the Parker Mark II are the only ones that are formed.

Now, assuming that is what you told him, would you have to add to that the Conoseal? I believe you agreed you would?

A That the Conoseal is both formed and machined.

Q Okay. How about the Corruseal?

A The Corruseal is not in the category of seals that we've been talking about.

Q Is it formed, Mr. Taylor?

A Is it formed? Yeah, all right, it's formed.

Q How about the Allison U-seal?

A I don't believe I've seen that one.

Q Is it possible the Allison U-seal is also a formed seal?

A I don't know.

Q How about the DSD V-seal?

A That is another in the class of forming plus machining.

Q Is it a formed seal?

A Plus machining.

MR. KELLY: Excuse me. Is that a V-seal?

MR. SULLIVAN: V, correct.

MR. KELLY: Victor?

BY MR. SULLIVAN:

Q You have in front of you there a catalog of Machine Design, 1973-'74 Seal Reference Issue. Would you turn to page 52, and particularly with reference to the TC metallic static face seals. Are they also formed seals?

A That I know of.

Q Do you know one way or the other, Mr. Taylor?

A To my knowledge, they're a machined V-seal.

Q Would you turn to page 68? There is reference down there to the Mott seal? Isn't it true that that is also a formed seal?

A I'm not sure of that.

Q Do you know one way or the other, Mr. Taylor?

A I'm not sure as it applies to the Mott seal.

Q You were pretty sure when you told the Court there are only two formed seals, C and Parker Mark II?

A Yes.

Q You are not so sure now?

A You have cited some examples.

Q Okay, page 118.

A Of this issue?

Q Yes, sir. Johns-Manville.

A Yes.

Q Isn't it true that they are also formed seals?

A With asbestos.

Q That was not my question. Are they formed seals?

A I don't know. They have asbestos in them. I don't know how they make 'em.

Q Let me refer lastly to page 120, and finally 122.

Page 120. Isn't it true that the seals referred to in table III are formed seals also?

A With asbestos-like material.

Q You have to add that to your list; wouldn't you?

How about 122?

THE COURT: He did not answer that last one.

A I'm sorry?

Q Would you have to add that to your list of formed seals?

A I don't believe this is in the class of seals that we're talking about. C-seals, V-seals and O-seals.

Q I am talking about formed as opposed to machined.

A Any seals?

Q Yes, sir.

A Any seals?

Q Yes, sir.

A Even molded?

Q How about the ones on page 122? Isn't it true that they are also formed seals?

A No, sir.

Q It is your testimony that none of those seals in figure 1 are formed seals?

A There's Parker Mark II and a C-seal.

Q How about this seal here?

A That's the Parker seal. That's a formed seal. That's what I testified. All of the others on that page are machined.

Q Do you recall some testimony where Mr. LaPrade was asking about Taylor's exclusive curved line, which is a claim that appears in some of your literature?

A Okay.

Q Do you recall it?

Three, the fact that the ID was unsupported --

A ID of the seal. Yes.

Q Yes.

A Okay, yes.

Q -- four, the fact that there were stops employed?

A Right.

Q Do you agree with that?

A Yes.

Q If someone uses a die with two matching halves and a center pin to manufacture C-rings, does that employ a confidential process of Pressure Science?

A Yes.

MR. SULLIVAN: Your Honor, I would like to have marked a memorandum entitled "Memo to H. R. Sommer," from Bernie Sniegowski, dated May 31, 1973.

THE CLERK: Defendants' Exhibit R, your Honor.

THE COURT: There being no objection, it may be marked Exhibit R.

MR. SULLIVAN: Your Honor, I should point out for the record that this exhibit has been previously marked, but it had some writing on it and also it was not the original and it was not a clear copy. That is the reason I am having it marked again. It is essentially a different document in its appearance, although it is the same in the content.

THE COURT: As what?

MR. SULLIVAN: As KR-4, your Honor.

BY MR. SULLIVAN:

Q Are you familiar with the content of that exhibit?

A Yes.

Q Do you need any time to look it over? Because I am going to ask you a lot of questions about it.

A Go ahead.

Q Is the concept -- and I am talking concept now, Mr. Taylor -- of die forming which is used in Exhibit 35, which is the two-piece die, set forth in that memorandum?

A Where?

Q Any place.

A Well, then, I'm going to have to go back and study it again.

Q Okay. Please do.

A Okay.

Q Do you have the question in mind?

A Is there any place in this memo that depicts the forming of a C-seal --

Q I think I'd better repeat the question, because that is not the question.

A All right.

Q Is the concept of die forming which is utilized in Exhibit 35, which is the two-piece die, revealed in that exhibit any place?

A No.

Q Is there any inkling or possibility?

A No.

Q I refer you to your deposition, page 88 --

MR. SULLIVAN: I think, for the Court to follow it, there is reference in the deposition transcript to Exhibit 56, which is the two-piece die.

Q "Okay. You cannot, from reviewing -- from what you have just reviewed, discern whether the concept of utilizing a die similar to the die depicted in Exhibit 56 for forming a metal seal is revealed -- is referred to in that exhibit?"

A "There is a slight inkling."

Q "Okay. Why is there a slight inkling?"

A "He says 'Notice how metal die set split.' I've never seen a metal die set split."

Q "Wait a minute."

A "I don't have a die set. A die set is two pieces of plate with posts on it. That's not a die set. Is that a die set? Hell, no."

Q "Is there a slight inkling? You said there is a slight inkling?"

A "He said half of the C, top and bottom. He didn't say which half and he didn't say where the stops were."

Q "Doesn't, in fact, Mr. Taylor, that show or envision the utilization of a die to form a C as a result of pressing two halves together?"

A "Which half?"

Q "Wait a minute. Just answer my question."

A "Yes."

Q "Yes."

A "Yes."

Q "Right?"

A "Yes."

Q "And isn't that similar to the concept which is depicted on Plaintiff's Exhibit 56?"

A "Not necessarily."

Q "Okay. Not necessarily?"

A "Right."

Q "Is it possible that it's similar to the concept depicted on Exhibit 56?"

A "Yes."

Q "Question: It's possible? Is it probable?"

A "No."

Q "Question: Now, it is not. Why isn't it?"

A "Because two points he has not stated, the direction that the C is and what the direction the metal is going to move within the die. He has not described what the stops are within the die, and these are important aspects to the config -- to forming a C-seal in that configuration."

Q "Assume that he knew which half to put in the proper relationship and he got the stops correct. Would that lead him to the result depicted in Plaintiff's Exhibit 56 in terms of forming a C?"

A "That would be one step on the way."

Q I do not recall the testimony after this, but, in the interests of shortening it, I believe that in terms of die design you thereafter agreed with me that, if he knew which half of the C to put in the top and bottom half and got the stops correct, it would be a die similar to the die depicted in Exhibit 56; do you agree with that?

A That was correct at that time. But on reviewing my -- the memo today --

Q Okay.

A Okay.

Q That was correct at that time.

MR. KELLY: Excuse me, your Honor. I would like to make a clarification. Mr. Sullivan said Exhibit 56 was a die. It really was not; it was a sketch of a die.

MR. SULLIVAN: He is correct, your Honor. It was a sketch, which I can have marked, which he drew to depict the two-piece die.

BY MR. SULLIVAN:

Q Is there any question about that, Mr. Taylor?

A (Shakes head)

Q Can you answer audibly?

A Yes. I'm sorry.

Q There isn't any question about that?

A No question about 56 being a two-piece die.

THE COURT: May I ask this:

During the course of discovery in this case -- and it seems to me there has been extensive discovery by competent counsel -- were there motions for production of dies used by Advanced Products Corporation in March 1973, April 1973, May 1973, June, et cetera, all the way

Honor.

THE COURT: Okay.

BY MR. SULLIVAN:

Q Now let's see if we can agree on a few things with respect to what is in that memo and what isn't in that memo.

Would you agree with me that there is reference and recognition in that memo of forming C-seals or C-rings from hoops?

A Yes.

Q Would you also agree with me that there is reference and recognition in that memo of welding strip to obtain bands?

A Which paragraph are you referring to?

Q Eight.

A Okay. The memo indicates welding of strip.

Q Would you also agree that there is reference and recognition in that memo that in full-scale production Advanced Products would have to have the capability to weld tubes in varying sizes since it was difficult to find tube stock?

Paragraph sixteen, if that is any help.

A Paragraph sixteen indicates that you would weld small diameter tubing.

Q I would prefer if you can answer it yes or no.

I have tried to be careful about the question.

A Okay. All right. Yes.

Q Would you also agree that there is recognition and reference in that memorandum of cutting slugs from tubing?

Paragraph seven.

A Yes.

Q Would you also agree that there is reference and recognition in that memorandum that TIG welding or plasma arc welding of strip could be employed?

A Yes.

Q Would you also agree that there is reference and recognition in that memorandum of the end crater problem?

A Yes.

Q Would you also agree that there is recognition and reference in that memorandum that flash butt welding was not practical?

Paragraph eight.

A Probably not practical.

Q With that qualification, your answer would be "yes"?

A Yes.

Q Would you also agree that there is reference and recognition in that memorandum of the need to pre-form edges of band using rollers, male and female?

Paragraph four.

A Yes, as discussed.

Q Would you also agree that there is reference and recognition in that memorandum of the need for a guidance system during rolling?

Paragraphs six, nine and seventeen-D.

A Six, yes.

Nine, I don't see it.

Q I will take it just from six. Your answer is "yes"?

A Yes to six.

Q Would you also agree that there is recognition and reference in that memorandum of the concept of forming large C-shapes using roll forming since it may be more economical?

Paragraph nine.

A Yes.

Q Would you also agree that there is reference and recognition in that memorandum of the concept of die forming a band into C-shape in die with half C in the top and half C in the bottom?

A No.

Q Eleven-four.

A No.

Q No?

Would you refer to your deposition, page 195, question at the top:

"Now I'm asking you whether that memo -- I'm not -- strike that.

"Question: Now I'm asking you whether that memo delineates all the possible steps in roll forming, Mr. Taylor."

MR. SULLIVAN: There should be a "not" in there, your Honor.

Q "I'm only asking you whether the concept of utilizing roll forming is set forth in Exhibit N? You understand that?" [The reference to deposition Exhibit N refers to trial Exhibit R.]

A "Do you know the concept of roll forming?"

Q "I'm here to ask the questions, you are here to answer 'em. Can you answer the question?"

A "All right. Look --"

Q Then there was some colloquy, and I believe the next answer --

A "Yes, the concept of roll forming is set forth in Exhibit N."

Q "How about the concept of die forming? Is that also set forth in Exhibit N, Mr. Taylor?"

A "Yes, the die concept, the concept of die forming is set forth."

Q Now would you read for me paragraph eleven-four, as it appears in front of you?

A Okay.

THE COURT: Now we are definitely talking about the concept of die forming a C-seal?

MR. SULLIVAN: Yes, your Honor.

THE COURT: All right, I just want to make sure.

A (Continuing) Eleven-four:

"Same as two. Two is straight mechanical compression between flats - via a metal die set split, but half C top and bottom. See my layouts blank and blank for further details."

Q Is it also true, Mr. Taylor, that there is recognition and reference in the memorandum in front of you of the concept that with small sizes under one inch straight die forming may be the best?

Paragraph ten.

A Yeah. He says that.

Q From your review of the exhibit, is there any indication in that memorandum on page 2, paragraph four, that indicates that Advanced Products was intending to use mandrils in the die?

A Mandrils in the die? No.

Q For internal support?

A No.

Q Isn't it true that that memorandum shows the concept of utilizing a die to form a C as a result of pressing two halves together?

A No.

Q Let me refer you to page 89 of your deposition, at the top.

"Doesn't, in fact, Mr. Taylor, that -- and 'that' refers to what I've just referred to -- show or envision the utilization of a die to form a C as a result of pressing two halves together?"

A "Which half?"

Q "Wait a minute. Just answer my question."

A "Yes."

THE COURT: Now may I have the last series of questions read back.

(The record was read by the reporter commencing at line 15, page 999, and ending at line 7, page 1000.)

BY MR. SULLIVAN:

Q Mr. Taylor, you do not hold yourself out as an expert in metal O-ring manufacturing techniques; do you?

A No.

Q Isn't it true that you have had little experience with metal O-rings?

A Yes.

Q Isn't it true that you do not know very much about metal O-rings today?

A I wouldn't say that.

Q How about when I took your deposition? Would you say that then?

A I may have.

Q Isn't it true that you have never made, used or tested a metal O-ring?

A No, that's not true.

Q Was it true when I took your deposition?

A I'm not sure.

Q That is what you told me.

A Okay. I have tested metal O-rings.

Q Had you tested them when I took your deposition?

A I'm not -- I don't believe so.

Q Can you list for me the metal O-ring manufacturers that you are aware of in the United States?

A United Aircraft Products, Advanced Products, DSD Magnatec Corporation, Bozang -- or Bozung, and I guess the new one, American Seal Company.

Q Isn't it true, in your opinion, Advanced Products is the best metal O-ring manufacturer in the United States?

A They advertise the most.

Q I did not ask you that, Mr. Taylor. I asked you whether you thought, in your opinion, Advanced Products was the best metal O-ring manufacturer in the United States.

A I can't make that judgment.

Q Let me refer you to your deposition, page 345, question at the bottom:

"Would you please give me your evaluation of Advanced Products as a maker of metal seals?"

A "It's always been my opinion that they're probably the best metal O-ring manufacturer in the United States, based on what I've heard in discussions from other customers."

Q "They have an excellent reputation for competence?"

A "Yes."

Q Would you agree with me, Mr. Taylor, that a person who has had experience in both metal O-ring and metal C-ring manufacture would be better able to give an opinion concerning whether the competence of a metal O-ring manufacturer is transferable to metal C-ring manufacture?

A No.

Q In any event, you do not have an opinion concerning the extent to which that competence is transferable; do you?

* * * * *

EXCERPTS FROM THE TESTIMONY OF
DAVID KRAMER

DAVID KRAMER, called as a witness by the plaintiff, being first duly sworn, testified as follows: that he was employed by the plaintiff from November 1971 until May 1973; that he was then employed by defendant Advanced Products and had been so employed since June 1973 [1017] Mr. Kramer further testified in part as follows:

* * * * *

MR. KELLY: Right, your Honor.

THE COURT: -- and getting an answer at trial. It should be just the opposite. You get your answer at trial and then see if it is consistent or inconsistent with your answer at the deposition.

BY MR. KELLY:

Q Mr. Kramer, what was your feeling on the question of whether or not Pressure Science considered its C-seal process proprietary?

A I did not consider any part of their process proprietary.

THE COURT: Could we kind of put a time period on this? At any time or when you went to work for them, when you left, or now?

THE WITNESS: At any time.

THE COURT: At any time?

THE WITNESS: Including now.

THE COURT: Including now; all right.

Q What led you to conclude that it was not proprietary?

A Well, there wasn't anything at Pressure Science that I hadn't seen somewhere before and had personal knowledge of.

Q Would it have been the fact that you claimed that no one had told you it was confidential and therefore you assumed that the process was not confidential?

A That's part of it, Mr. Kelly.

Q Why don't you turn to page 48 of your deposition, Mr. Kramer, the last question and answer:

"Am I correct in understanding that this is your feeling, that none of the steps involved in the process of manufacturing C-seals were considered confidential by Pressure Science? Is that what you are saying?"

A "It is my understanding that -- and I was never told that they were confidential. There was never any discussion that they were confidential, so I can only assume in answering that -- your question that they did not consider them confidential, and I stick by that statement."

Q Turning to page 61, Mr. Kramer:

"Question" --

MR. SULLIVAN: Wait a minute. Could you tell me where on 61?

MR. KELLY: I am reading it, third question down.

BY MR. KELLY:

Q "Now I'm referring once again to the method by which Pressure Science" --

A Wait, let me find it.

Q -- "produces its C-seals. I believe you stated that you felt that the company did not consider that was confidential information?"

A "Well, it was never stated to me that it was confidential, so I'm only assuming that they did not consider it confidential."

And I still don't.

Q So a key reason for your conclusion that the processes were not confidential is because you were not told; is that what you are saying?

A That's part of it.

Q And you made an assumption that, because you were not told, it was not confidential; correct?

A That's correct.

Q You had had some experience with the notion that industrial companies sometimes keep information as trade secrets? You had heard the term "trade secret," hadn't you--

A Yes, sir.

Q -- prior to your Pressure Science employment?

A Yes, sir.

Q And had you heard the term "proprietary"?

A Yes, sir.

Q Mr. Kramer, there were some admissions in this litigation addressed to you; do you recall those? Requests? Requests for admission?

Let me show you this and ask you if at some point you had occasion to identify it.

MR. LaPRADE: May I see what the witness is looking at?

THE COURT: Did you finish your question?

MR. KELLY: Yes. I showed it to the witness and asked him if he could identify it, your Honor.

MR. LaPRADE: I object to that, your Honor. This document is something that relates to a prior employer of Mr. Kramer who was not in the C-seal business, does not have a thing to do with C-seals.

Once again, just let me emphatically state that this is going to open a Pandora's box, and as soon as the insinuations start to be made I am afraid that it is going to be my responsibility to attempt to rebut all this.

It is difficult to rule on the objection without knowing what is in there, and, if your Honor would like a little background, I will be happy to give it to you at this time.

THE COURT: All right.

MR. LaPRADE: Your Honor, Mr. Kramer was fired on the spot by Raytheon Company, two employers removed from Pressure Science, not a maker of seals of any kind, to my knowledge, because of -- there is no real dispute about it -- some inconsistencies; he had stated some inconsistent statements about his educational and work experience. After he was fired he did not return to his office. His belongings were wrapped up by Raytheon employees and sent to him, and among those belongings that were wrapped up by Raytheon employees, which had been in Mr. Kramer's office, to which he did not return after being fired on the spot, there were some documents that related to products made by Raytheon.

And I think it is noteworthy that Mr. Kelly and Mr. Schneider have in their possession a report by a Raytheon security man which does not dispute this account that I have just given you. Raytheon wanted that material back from Mr. Kramer, and they brought a lawsuit to get it back, and that is what this document relates to.

I should also add that Mr. Kelly and Mr. Schneider also have in their possession a statement, a report, by someone else, indicating that this information was not proprietary that was included within these Raytheon documents.

This is what we are going to get into, your Honor. It has nothing to do with C-seals.

THE COURT: What is the relevancy? Assuming that it is a fact and assuming it comes into evidence, what legal principle that I should be concerned with is tied up with this evidence?

MR. KELLY: I would like to have Mr. Schneider address that, your Honor.

MR. SCHNEIDER: What you are saying is, assuming that it is in evidence, why is it important, so that we are not talking about --

THE COURT: Why is it relevant?

MR. SCHNEIDER: I think it is relevant simply, on the first reason, to show a very similar prior act, and, although those, as such, may not come in, I think there is the additional reason to show Mr. Kramer's knowledge of the meaning of proprietary, the importance of proprietary.

What we have been told so far in some of the cross-examination and some of the comments by defendants' counsel is that Mr. Kramer, in effect, was a babe in the woods in this proprietary business, that he had no --

THE COURT: Let me cut you off right there. There is nothing that the witness has said that indicated that to me. He said he understood what proprietary meant, he knew what a trade secret meant. I do not know what happened outside --

MR. SULLIVAN: Your Honor --

THE COURT: Just a minute.

(Continuing) -- outside the courtroom, with which I am not concerned. But so far there is nothing in the evidence that leads me to believe that Mr. Kramer did not know the importance of it. In fact, he was not asked; all he was asked was "Do you know or have you heard the term 'proprietary.'"

If some of this evidence that you think might come in does come in, then I may have to reconsider my thinking. But right now I do not see the relevance. In other words, the witness has never said he is a babe in the woods or he does not recognize that the word "proprietary" means that you do not carry it outside the factory or that "trade secret" means that it is a highly prized method used by his employer. I have not heard anything like that. Maybe that is somewhere else but it is not before me.

MR. SULLIVAN: To my knowledge, it is not, your Honor, and I think that is the claim that was made out of whole cloth right here. I have never heard it anywhere, and I have been involved in this litigation from the inception.

THE COURT: The only point that does concern me a little -- and I might have to ask counsel for some reference -- on the one hand, I do not want to open count three; that's for sure. But, on the other hand, I have to make some rulings on wrongfulness here; don't I? Well, let me ask: Do all counsel agree on that?

MR. SULLIVAN: Not quite, your Honor.

THE COURT: It was your brief I was looking at.

MR. SULLIVAN: I believe it is a two-step process, your Honor. I believe that we discussed earlier the fact that that is a fine line wrongfulness, and I believe the Court took the position, properly so, that we should really save that for the damage trial. I believe you can address yourself to the sole question as to whether or not we are dealing with trade secrets, and that keeps the evidentiary points --

THE COURT: No. Liability, from your own brief, is predicated upon two essential factors. First, there could be a trade secret here --

MR. SULLIVAN: Yes, your Honor.

THE COURT: Let's assume I decide this is a trade secret and make no other finding. Where are we?

MR. SULLIVAN: You are correct. To find liability you would therefore also have to find wrongfulness. But I had understood --

THE COURT: The way you word it in your brief is "wrongful appropriation."

MR. SULLIVAN: Correct, your Honor.

THE COURT: Right?

MR. SULLIVAN: Correct.

THE COURT: I assumed when I read that that meant that it was a noninnocent appropriation. I am not sure of the law; I have not researched this thoroughly. In other words, I thought from reading your brief, because your brief is the only one that went into this, that even if it is a trade secret or a proprietary item, if your client, Advanced Products, was really innocent of that knowledge, there would be no liability.

MR. SULLIVAN: I believe that that is an accurate statement of the law, your Honor.

THE COURT: First of all, is that an accurate statement of the law?

MR. KELLY: Your Honor, if the knowledge came from a wrongful disclosure, then there is liability and they can be enjoined.

THE COURT: I am not asking you to adopt the very language used by the defendants, but I am asking you if the general principles are correct.

On page 17 of the defendant's brief it says:

"Assuming the information meets the necessary criteria" -- and I am just saying assuming I found, for the sake of argument -- and is found to constitute a trade secret, it also must be established that the defendant obtained the information by use of improper means."

MR. KELLY: That is right.

THE COURT: It is a two-pronged test.

MR. KELLY: Essentially we are talking about a wrongful breach of confidence here, and, you know, that has to be established. There could be an innocent disclosure by publication or by Mr. Taylor telling someone, in this case. The gravamen of the cause is a wrongful breach of confidence.

MR. LaPRADE: Before the Court rules, I would like to add one thing --

MR. SCHNEIDER: I wanted to follow up --

THE COURT: I cut off Mr. Schneider, and I think he should finish his statement.

MR. SCHNEIDER: I think you were talking about this being made out of whole cloth, and I think yesterday Mr. LaPrade was asking questions about Pressure Science dealing with proprietary information which led Mr. Kramer to believe that, since they dealt cavalierly -- and we do not agree with that, but that was the insinuation -- that he assumed that he could deal cavalierly; and I think what this evidence would show was that there was no mistake. That is what I was talking about when I used the phrase "babe in the woods." I think there has also been and will be more evidence that the catalog used "exclusive" rather than "proprietary," and they are trying to make some argument that that is somehow confusing.

Finally, I think that the new federal rules specifically point out -- rules for evidence, 404(b) -- that you can use this evidence to show the absence of mistake; and Mr. Kramer has just testified that because he was not told that it was proprietary he could draw no other conclusion but that it was not proprietary, and what we are trying to show is that he had some prior knowledge and that this was not a conclusion which could be drawn.

THE COURT: What I am going to do is this: I am going to sustain the objection without prejudice. I get the feeling you are jumping ahead as to what Mr. Kramer is going to say. I have not heard him say it yet. He may say it. He may say, "Well, the employer treats it cavalierly." What if he says "No; I appreciate what a proprietary secret is; I know what it is, and my mouth must be forever sealed," et cetera, et cetera? He is not saying the things that you are going to say.

MR. SCHNEIDER: I think it is also just purely and simply relevant because of what this information shows that he did in the past.

THE COURT: With respect to the new rules, of course, they are not applicable yet.

MR. SCHNEIDER: I would cite you --

THE COURT: Just a minute.

MR. SCHNEIDER: I am sorry.

THE COURT: Are you referring to the prior similar acts section?

MR. SCHNEIDER: Under the new federal rule, it talks about other crimes, wrongs and acts.

THE COURT: Just as an aside, when I read that recently I wondered about that. That is really going to create some writings by Judges and authors, because I wondered as I read that -- if we are thinking of the same rule -- I do not have it in front of me -- whether in a negligence case, if you claim that the defendant went through a light, a red light, on this trial, evidence that he has gone through that same light on prior occasions is admissible. So I do not know. I think that rule, along with the hearsay rules, is one that is going to cause Judges quite a bit of soul searching.

MR. SCHNEIDER: I just wondered if I could make one other point.

THE COURT: Go ahead.

MR. SCHNEIDER: I think that the present 2nd Circuit rule, as spelled out in United States against Kaufman and United States against Deaton, is that these acts are relevant and admissible absent a strong basis for exclusion.

THE COURT: Do you have those citations?

MR. SCHNEIDER: Yes. Kaufman is 433 Fed. 2nd, 306; Deaton is 381 Fed. 2nd, 114.

THE COURT: Okay, I am going to read those cases; but, just so you know where you are going, I am going to sustain the objection without prejudice. I want to hear a little bit more from this witness before we hit him head on with prior similar acts, lack of knowledge, lack of credibility and all this which has been in the background here since this case started. I almost get the feeling this type of evidence, if it becomes relevant, must become relevant after this witness has said some of the things that you think he is going to say. He may not say them. So I sustain the objection without prejudice and with the thought in mind that after I read the two cases, which I am not familiar with, I might change my mind Tuesday. But right now I think I will rule tentatively so you will know where you are going Tuesday, Mr. Kelly. I may change my mind, but I doubt it.

MR. LaPRADE: Your Honor, I realize the Court has ruled, but, since the objection was sustained without prejudice and the subject may come up again, we discussed it a little bit. There is one point I would like to make. I think it is relevant.

With regard to all these "prior acts," the presumption is that the information involved was proprietary, was a trade secret; and, of course, that is what we are going to spend weeks here to determine just for C-seals.

THE COURT: That is another reason. It is not a bad point he is making.

MR. KELLY: It is not quite correct that --

THE COURT: You know, if he took soap from the lavatory of Raytheon is one thing; but, you know, if he took some information that was not proprietary --

MR. SCHNEIDER: Your Honor, could I just address that? Because I do not think the statement is correct.

The very doctrine we are talking about represents an answer to the question which Mr. LaPrade is raising. That is why I do not think in this particular case it calls for any collateral.

THE COURT: You mean he admits it is proprietary.

MR. LaPRADE: I totally disagree with that, your Honor, and let me say that the plaintiff has in its possession a report indicating that that information is not proprietary.

THE COURT: I remember you saying that before.

MR. SCHNEIDER: I think anyone can read it.

THE COURT: My ruling is sustained without prejudice, and I will look at the cases and I will let you know Tuesday.

MR. SULLIVAN: Your Honor, I do not want to

A Yes.

Q Do you think they accurately stated what your responsibilities were?

A Yes.

Q Where would you say you ranked in the hierarchy at Pressure Science?

A Number three or number four.

Q As a number three or four person in that hierarchy, you were privy to policy-making decisions within the company?

A That's correct.

Q I assume you had pretty much free access to the plant?

A Yes, sir.

Q You had access to engineering drawings, blueprints?

A Yes, sir.

Q Was tooling design one of your responsibilities at Pressure Science?

A No, sir.

Q But on occasion you did design tools, jigs and fixtures, didn't you?

A Yes.

Q Mr. Kramer, have you graduated from MIT?

MR. LaPRADE: Objection.

THE COURT: Overruled.

A Yes.

Q You had reviewed those? You had read them over?

A Yes.

Q Mr. Kramer, I believe you stated during your testimony on Friday that you were familiar with the use of terms such as "proprietary" and "trade secret" by industrial companies, in general; is that correct?

A That's correct.

Q While you were at Pressure Science, were you aware that something an employer claimed as proprietary may not be disclosed by an employee without authorization?

MR. LaPRADE: Objection as to legal conclusion.

THE COURT: What is a legal conclusion about that?

MR. LaPRADE: Just about the law of trade secrets, your Honor, and that is going to be argued by the lawyers and determined by the Court.

THE COURT: I do not believe that question calls for any type of a legal conclusion. Objection is overruled.

Read the question back.

(The pending question was read by the reporter as above recorded.)

A Yes.

Q In fact, Mr. Kramer, isn't it true that in 1968 you were sued by the Raytheon Company for wrongful possession of certain of Raytheon's proprietary information?

MR. LaPRADE: I object to that, your Honor. It is the same objection I made Friday, and Mr. Kelly is just coming at this from a different angle, and I would be happy to repeat --

THE COURT: What is the purpose of the question?

MR. KELLY: Your Honor, I am attempting to probe the witness' understanding of proprietary.

THE COURT: There is not much to probe. He has admitted it. He said, "Yes, I recognize that if my employer considered something proprietary I should not reveal it."

The reason I overruled the prior question is that I do not think that calls for a legal conclusion; that is a conclusion he reaches as an employee. All right. And he also testified he knows what proprietary means: You do not tell anyone else. And he knows what confidential means. He has used the expression.

What are you impeaching him by -- this is impeaching testimony --

MR. KELLY: Your Honor --

THE COURT: -- and there is nothing to impeach. He admits he knows what proprietary means; he admits he knows that if something is proprietary it should not be told to another; and he admits he knows what confidential means. What's to prove?

MR. KELLY: I think it goes to this, your Honor:

He has admitted a lot of these facts, but he is still making the claim over-all that, since no one told him that this process was confidential, he then assumed that it was not. And I think this question is relevant and it is probative on the quality of that claim that he has made.

THE COURT: I think it is tenuous and remote. I am going to sustain the objection.

If he said "I don't know what proprietary means, I don't know what a trade secret means, I have no knowledge of this at all," and then you say "Well, weren't you sued over this very fact," which the Court could assume he certainly learned a little bit about, if he had a lawsuit

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concerning it, then I would admit it. But there is nothing to dispute. He has admitted everything so far with respect to that subject.

MR. LaPRADE: May I be heard on one point, your Honor?

THE COURT: Yes.

MR. LaPRADE: I know this is not a jury trial, and I would just state that it is our contention that, assuming there was a suit by Raytheon, there is an awful lot involved there; and I would ask the Court to disregard any reference to it.

THE COURT: Questions are not evidence; only answers.

BY MR. KELLY:

Q Mr. Kramer, did you ever have occasion at Pressure Science or at the time of your firing to ask anyone at Pressure Science whether they considered their C-seal process proprietary?

A No.

Q Did you remark to Mr. Taylor after you were fired, shortly after you were fired, that you had not signed a non-disclosure agreement with Pressure Science?

A Yes.

weren't you?

A Yes.

Q And you were hired as an engineer; correct?

A Correct.

Q What was your salary to be?

A $22,000 a year.

Q What is your current salary, Mr. Kramer?

A 22,660.

Q When did you start work at Advanced Products Company?

A 17th or 18th of June.

Q So it was roughly a couple of weeks after the second meeting, roughly a couple of weeks after the time you were offered employment?

A Yes.

Q At the time you were hired by Advanced Products, was Advanced Products producing C-seals by a precision metal forming process?

A No.

Q But the Advanced Products Company was interested in developing such a process; right?

A Yes.

Q Since your employment, since the date of your employment by the Advanced Products Company, have you developed a manufacturing process relating to C-seals similar to the process used by Pressure Science?

A Yes.

Q And Advanced Products Company is now using the C-seal manufacturing process similar to Pressure Science's?

A Yes.

Q Mr. Kramer, you were hired by Advanced Products Company as an engineer, as you testified. Would you agree with this general statement of your responsibilities:

> "Came to Advanced Products to make C-seals and was hired for that purpose, to make C-rings, and that was my assignment, make C-rings."

A I'll agree with that.

Q For clarification, the product that the Advanced Products Company calls the C-ring is essentially the product the Pressure Science calls a C-seal, just so we do not get involved in semantical differences; is that correct?

A Yes.

Q At the time of your deposition in December 1973, were you familiar with O-ring manufacturing techniques?

A No.

Q In fact, you knew very little about O-ring manufacturing at that point; didn't you?

A That's correct.

Q As part of your assignment at the Advanced Products Company to make a formed C-seal, did you design a die?

A Yes, I did.

Q The first die that you designed -- when was that designed?

A September of '73.

Q It was produced at the Advanced Products Company?

A Yes, it was.

Q Had you seen any other similar die in existence at the Advanced Products Company at the time you made it?

A No.

Q Did you require the assistance of Mr. Sniegowski in designing the die?

A No.

Q Did he help you at all in the designing of the die?

A Not that I recall.

Q Do yourecall who did help you, if anyone, in making the die?

A Machinist.

Q So it was essentially you making the machine drawings and a machinist turning the cavity on the lathe; right?

A No.

Q No? You did design the die, though; correct?

A Yes.

Q And the machinist assisted you in the design of that die?

A Yes.

Q Mr. Sniegowski did not; correct?

A That's correct.

THE COURT: What was the machinist's input into the design and production of the die?

THE WITNESS: His knowledge and years of experience as a machinist.

BY MR. KELLY:

Q Did he help you with the cavity, Mr. Kramer?

A Yes, he did.

Q Did he help you make drawings, the design drawings?

A No.

Q You presented him the drawings; right?

A No.

Q How did he know what to turn out on his lathe?

A We discussed the customer's needs.

Q With this machinist you discussed the customer's needs?

A Yes.

Q And then you prepared the design drawings?

A No.

Q No? I thought you stated that you designed the die, Mr. Kramer.

A That's correct.

Q How did you design the die?

A With the machinist.

Q Didn't you make a machine drawing of it?

A No.

Q Oh, you just worked from what you had in your head?

A No.

Q How did you design the die, Mr. Kramer?

A We worked by reverse engineering from the customer's print.

Q Isn't it also true, Mr. Kramer, that this design, the die, you drew on your Pressure Science experience?

A Yes.

MR. KELLY: Your Honor, I believe the die that I am referring to is in court, and I was going to ask that it be produced at this time. It was marked as Plaintiff's Exhibit E at Mr. Kramer's deposition.

Q Mr. Kramer, I am handing you this die which has been produced by Mr. Sullivan.

I ask if you can identify the die.

A Yes, I can.

Q What die is that, please?

A It's a die for a .801 C-ring.

Q Is that the die that you designed at the Advanced Products Company--

A That's correct.

Q -- to which your recent testimony has referred?

A Yes.

Q Is that the first die you made?

A No.

Q Was that die made in September of 1973, Mr. Kramer?

A Yes.

Q You had made earlier dies--

A Yes.

Q -- for the Advanced Products Company?

A Yes.

Q Was that the first functional die?

A No.

Q Have you made other dies since then, Mr. Kramer?

A Yes.

Q How many?

A Eighty or ninety.

Q These are all for the Advanced Products Company?

A That's correct.

MR. KELLY: I'd better offer that in evidence.

MR. LaPRADE: No objection, your Honor.

MR. SULLIVAN: I have none.

THE COURT: Exhibit 76?

THE CLERK: 72, your Honor.

THE COURT: Do you only make dies for different sizes, or do the dies wear out for a particular size after a while?

THE WITNESS: Both, your Honor.

THE COURT: What do you do with a die that, say, wears out?

THE WITNESS: You can reuse it. You can reuse the material again.

THE COURT: In other words, at Pressure Science -- let's go to the plaintiff -- when a die was no longer being used either because it was worn out or for some reason was not functional or because it was no longer needed for that particular size, did each one of those dies go into a machine shop where they were reused, or were they put in a bin or were they thrown out, or what? Do you remember?

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Excerpts From the Testimony of Harvey R. Sommer

HARVEY R. SOMMER, called as a witness by the plaintiff, being first duly sworn, testified as follows: that he is president of defendant Advanced Products and has been since he helped found it in 1954 [1181]; and that defendant Advanced Products is a competitor of the plaintiff [1186]. Mr. Sommer further testified in part as follows:

* * * * *

A I think so.

Q So at the time they were still under the original name of High Pressure Engineers you had heard of the company?

A Yes.

Q Were you familiar at that time with what they were marketing, with what their products were?

A Just the metal C-ring.

Q So you were familiar in the early '60's that Pressure Science or High Pressure Engineers, as it was called then, was marketing a metal C-ring or C-seal?

A Yes.

Q Would you say that the O-ring is a direct competitor of the C-seal?

A Frequently.

Q Please?

A Frequently.

Q So that is a fair statement?

A Yes.

Q Mr. Sommer, would you explain briefly why you decided to get into the forming of C-seals, and try to be fairly precise with dates, if you can think of it.

A Did you say why?

Q I assume that at some point you decided you wanted to make a formed C-seal; is that correct?

A Yes.

Q What I would like you to explain is why you made the decision, you know, and when, what preceded, what led up to, this decision to make a formed C-seal.

A In the latter half of '72 and the early half of '73 we found that our metal O-ring business was being eroded in a couple of directions. Three people whom we had discharged formed a company manufacturing metal O-rings in competition with us. Another company in Ohio, called Vac-Hyd, had also started making metal O-rings. We also found that many of our metal O-ring applications were being substituted by the C-ring, the C-seal, from Pressure Science, and we were finding more inquiries from our customers asking us to make C-rings because they wanted another source.

Q So essentially it was competition that led you to discuss seriously getting into a formed C-seal; is that correct?

A I'm not sure that's all-encompassing.

Q I mean was a consideration in your decision the fact that there was no competition and that the C-seal was replacing the O-ring, and weren't those --

A Yeah, that's what I stated.

Q When was the decision made, you know, to get into forming of C-seals?

A Well, in early '73.

Q Please?

A Early '73.

Q Were you having meetings with Mr. Hostage, or how did you arrive --

A Mr. Hostage was pressing us to make metal C-rings.

Q Mr. Hostage was?

A Yes.

Q He is the sales manager; is he not?

A Yes.

Q Presently with Advanced Products Company?

A Yes.

Q So he would be aware of customer desires; correct?

A Yes, indeed.

Q But are you the over-all director of engineering at the Advanced Products Company?

A Yes.

Q Do you have project engineers on your staff?

A Engineering manager and --

Q Who is that, please?

A Kenneth Bell.

Q All right.

A -- and the project engineer, Bernie Sniegowski, at that -- at that time, in the spring of '73.

Q What is Mr. Sniegowski's present function?

A He still is a project engineer, plus quality control manager.

Q He is a project engineer for what, please?

A Anything.

Q Please?

A Anything.

Q Anything?

A Yes.

Q How about Mr. Bell?

A Mr. Bell is engineering manager and -- but mostly provides engineering through the sales department.

Q Now what I would like to focus on, if we can, is the time frame early 1973 and your decision to develop a process to form C-seals.

Did you have meetings during this period with Mr. Bell, Mr. Sniegowski? Did you have meetings or talk about this?

A Yes, indeed, quite a few.

Q You had a number of meetings?

A Yes.

Q As a result of these meetings, at some point in the spring of 1973 did Mr. Sniegowski prepare a memorandum with reference to C-seals?

A Yes, he did.

Q That is the memorandum that Mr. LaPrade introduced earlier, with some markings on it, and then Mr. Sullivan introduced the original of; is that correct?

A I believe so.

Q Various marked as KR-4 and Exhibit R.

This memorandum was a result of numerous conversations you had had with Mr. Sniegowski and Mr. Bell?

A Yes, sir.

Q Anyone else?

A I don't recall.

Q But it was at least those two people in the spring of 1973. Okay.

I am going to ask you a few questions with respect to this memorandum, Exhibit R, Mr. Sommer, so I am going to give you the original.

The memorandum is addressed to yourself; correct?

A Yes.

Q And it is from Mr. Sniegowski?

A Yes.

Q And the subject is "General Comments on C-seal

Forming Methods"?

A Yes.

Q The opening paragraph states:

"In view of our recent meeting on this subject" --

By the way, I see it is dated May 31st. Do you know if it was prepared at that time? Do you know? Did you see it being prepared?

A I did not see it being prepared.

Q Do you recall approximately when the date was that you first saw it?

A I'm sure it was on that day or the next day.

Q It is likely that you probably saw it later that day or the next day?

A Yes.

Q I see that there is reference in the first line to a "recent meeting on this subject."

Do you have any idea when that meeting might have been that is referred to in the first paragraph?

A Not really. I would expect it would have been the first two weeks in May.

Q First two weeks in May, you think?

Do you know who attended that meeting?

A I'm sure Bernie did. I'm not sure if Ken was there.

Q One thing I want to clarify:

You have stated earlier that there were numerous discussions starting early in 1973 through the spring about the need to get into forming C-seals; correct?

A Yes.

Q What I want to ask is:

Do you have specific recollection of this particular meeting that Mr. Sniegowski refers to in the memorandum?

A No.

Q Oh, you do not? All right. And you cannot specifically fix a date when this meeting might have occurred?

A No, sir.

Q Did you request Mr. Sniegowski to prepare this memorandum?

A No, sir.

Q He did it on his own?

A Yes, sir.

Q If I recall your testimony, you probably received the memorandum either on May 31st or June 1st?

A Probably.

Q Do you recall if you reviewed it when you got it?

A Only -- just to read it.

Q Did you call Mr. Sniegowski in and have him give a briefing on what was in the memo?

A No, sir.

Q In other words, you received the memo, you read it, and what did you do with it then?

A Just left it on my desk.

Q For how long? I mean what did you do with the memo after you read it?

A Nothing.

Q Please?

A Nothing.

Q Mr. Sommer, when was the first time you heard of David Kramer?

A Approximately May 15th.

Q This would be a telephone call?

A Yes, sir.

Q He was calling you, soliciting employment; is that correct?

A Yes, sir.

Q This was around the middle of May? This would have been right around the time possibly when you had this meeting with Mr. Sniegowski; correct?

A This would have been after the meeting.

Q Were you familiar with the Pressure Science catalog prior to this litigation?

A Yes.

Q Can you recall approximately how long ago you had occasionto review a Pressure Science catalog? First time?

A Prior to the litigation?

Q Yes.

A Probably within five or six months prior to the litigation. Prior to the litigation?

Q Yes.

Let me put it this way: When was the first time you can recall seeing a Pressure Science catalog?

A Many years ago. I couldn't estimate.

Q Had you received over the years updates or different issues of the catalog?

A I think so, yes.

Q Do you do this with all your competitors? You try to keep current on what their sales catalogs are?

A Yes.

Q You were aware, weren't you, Mr. Sommer, that Pressure Science Company made proprietary claims with respect to C-seals? Weren't you?

A Not really, no.

BY MR. KELLY:

Q Mr. Sommer, had you also seen advertisements placed by Pressure Science in Machine Design, for example?

A Very likely.

Q This was before you hired Mr. Kramer also?

A Yes.

Q Did you read their ads?

A I'm sure I did.

Q There has been a lot of testimony about certain passages in those ads.

Let me ask you this: In view of the fact that you had read Pressure Science's catalog and you recall that a proprietary claim was made and you had reviewed advertisements placed by Pressure Science in Machine Design, why is it that you were able to accept, you know, the volunteered opinion of Mr. Kramer that nothing was proprietary that Pressure Science did?

A I don't think I testified that the proprietary claim was made, that I understood that. And I don't recall any proprietary claims in the ads.

Q Do you recall reference to an exclusive process in the ads?

A That means nothing to me.

THE COURT: I just want to keep my notes

straight. I thought you said you did see --

THE WITNESS: The word "proprietary."

THE COURT: Yes. But you did not know what it meant?

THE WITNESS: But this sort of implies that I knew all about what that word "proprietary" means in that catalog, the way he presented the question to me. I felt that I was being asked to confirm something I didn't say before, and that's why I answered indirectly.

BY MR. KELLY:

Q Let me ask you this, Mr. Sommer:

Is there any reason why you -- any particular reason -- did not place much credence in a proprietary claim?

MR. SULLIVAN: Objection, your Honor. The question is ambiguous. Is he asking the witness is there a proprietary claim with respect to C-rings in PSI's catalog or is he asking him is there some proprietary claim? I think that is what is confusing the witness and your Honor.

THE COURT: I am not confused. I think I know what the witness said. On the other hand, the question does assume a fact not in evidence, and I will sustain the objection.

But you may pursue this line of questioning.

BY MR. KELLY:

Q You said you saw a reference to a proprietary claim in the Pressure Science catalog, Mr. Sommer?

A I said I saw the word.

Q You saw the word "proprietary"?

A Yes.

Q What did it mean to you when you saw it in their catalog?

A If I recall, it said seals, couplings and flanges to proprietary design.

THE COURT: Keep your voice up. He has to pick it up.

A (Continuing) We know that the C-seal is not a proprietary item; therefore, the wording in the catalog had to refer to flanges and couplings, because it talked about the design of product; so that's about the most I could read into it if I studied it indefinitely.

Q Did you ever feel, Mr. Sommer, that a lot of other seal manufacturers made proprietary claims that they could not back up?

A Frequently.

Q Frequently?

A Frequently.

Q Is this something that you would see often in the advertising of other competitors?

A Oh, question of often or not I don't know, but I frequently --

Q You said frequently?

A I've frequently seen such claims, yes.

Q This would be with reference to competing seals?

A Well, seals and other things, yes.

Q Mr. Sommer, I have here Plaintiff's Exhibit 7, which is the Seals Reference edition of Machine Design dated June 19, 1969. I am going to ask you a few questions with reference to that exhibit.

A I'm sorry?

Q That was not a question. I am going to ask you a few questions with respect to Exhibit 7.

Are you familiar with that issue, Mr. Sommer? Is it likely that you reviewed it at one time?

A Yes, it is.

Q Will you turn to page 181 of Exhibit 7, Mr. Sommer.

You find an Advanced Products ad on that page?

A Yes, sir.

Q Would you turn the page over to page 183, please.

You see a Pressure Science ad there, on 183?

A Yes, sir.

Q As you look at that ad, is there any reference to an exclusive process?

A Yes, sir.

Q I would like to invite your attention to, back to page 181, the Advanced Products ad.

Is there any claim for an exclusive process or proprietary claim in the Advanced Products ad?

A I don't believe so.

Q You are familiar with your ads; aren't you, Mr. Sommer? Do you make proprietary claims in your ads?

A No, sir.

Q All right.

A Except for those inventions.

Q Please?

A Except for the seals that are invented and patented.

Q What seals have you invented?

A That are invented, not by us.

Q You mean some of your licensed seals?

A Yes, sir.

Q There are none in that ad; are there?

A No.

Q On page 181 of Exhibit 7, Mr. Sommer?

A Right.

Q If you would look also on page 181, you will find a DSD ad.

Is DSD one of your competitors?

A Yes, sir.

Q You see any claims for an exclusive process in the DSD ad, Mr. Sommer?

A No, sir.

Q Mr. Sommer, are you familiar with the Parker V-seals?

A Somewhat.

Q They be considered a competitor to your Lo-Load machine seal?

A Some applications.

Q Would you look on page 180.

You see an ad there for Parker V-seals?

A Yes, sir.

Q Any claims to an exclusive process with respect to the Parker ad?

A I don't see one.

Q All right. Just one more, Mr. Sommer.

If you look on page 184, can you find a United Aircraft Products ad?

A Yes, sir.

Q Are they a competitor?

A Yes, sir.

Q They make any proprietary claims in their ad, Mr. Sommer, any claims for an exclusive process?

A I don't know if this is responsive, but they say "Patented."

Q Well --

A The product, not the process.

Q Is there any claim for an exclusive process there?

A No, sir.

Q Mr. Sommer, in view of these questions with reference to Exhibit 7, let me ask you what was your basis for saying that these claims were made frequently by your competitors and you could disregard in essence any proprietary claim that Pressure Science makes.

A I don't believe I said they are made frequently by our competitors. I wasn't talking about processes. I was talking about claims that are frequently --

Q Please?

A I was talking about claims that are frequently made that really can't be backed up. I was not talking about processes.

Q The preceding series of questions asked if you saw any claims made in those ads; did it not?

A Yes, it did.

Q And you could not identify --

A Right.

Q -- with reference to those ads any claims for an exclusive or proprietary process other than what is shown in the Pressure Science ad; isn't that correct, Mr. Sommer?

A Yes.

Q So how could you conclude that Pressure Science's proprietary claim was not very significant?

A In the first place, Mr. Kelly, exclusive doesn't mean anything proprietary to me. If Pressure -- Pressure Science was the only ones making -- the only ones making C-seals, they could say it was exclusive, because nobody else was making them. If they're the only ones making 'em that way, then I'd question if they knew that. And the word really means nothing to me.

Q But you knew that Pressure Science was the only company making C-seals on a large-volume basis; they were the leader in the industry; right?

A I think so, yes.

Q You knew that there had been proprietary claims or exclusive process claims in their ads; correct?

A No.

Q You did not know that? I thought you said you had seen Pressure Science ads?

A It says "Exclusive," but that's not a claim.

Q You had seen the phrases used in their ads "exclusive process" or the word "proprietary" in their catalog; correct? Isn't that true, Mr. Sommer? You had seen them?

A As you stated, I think it's true, yes.

Q Not as I stated, Mr. Sommer. I am asking you hadn't you seen them.

A I saw the word "proprietary" and I saw the word "exclusive." I testified to that, and I don't change that.

Q I do not want you to change it, Mr. Sommer.

A Okay.

Q I want you to tell the truth.

Didn't it ring a bell or raise a flag when Kramer said "I know everything they make about C-seals and there ain't nothing proprietary"?

A No, sir.

Q Mr. Sommer, isn't it true that some years ago the Advanced Products Company made inquiries about buying Pressure Science?

A Yes.

of 1973?

A Yes, sir.

Q But there was a lapse of a couple of months before you actually produced your first formed C-seal?

A I think so, yes.

Q The other seals that you manufacture at your plant, the O-ring, the clam seal and the Lo-Load seal -- is that correct?

A Yes.

Q -- none of those seals are formed; are they?

A No, they're not. They're machined.

Q Except for the O-ring? That is not machined?

A The O-ring's a forming, but --

Q It is not die formed; is it?

A No.

Q The first formed seal that was produced at the Advanced Products Company was done under Mr. Kramer's direction; correct?

A Yes.

Q You still have Exhibit R in front of you, Mr. Sommer?

A Yes.

Q I believe you testified earlier that prior to actually making the offer to Kramer on June 1st you had

A Yes, sir.

Q Can you tell me who made the approach to High Pressure Engineering on behalf of Advanced Products?

A We had hired Mettler Associates, a person -- Larry Clark, who was asked to search out small companies of compatible items of manufacture for us to purchase or merge with, and he sent out some of them that he used to -- an Automatic Typewriter, one of the names that we gave him -- some of the -- plus many of the names he picked out. himself. But one of the names was High Pressure Engineering.

Q So it is fair to say at that time an approach was made to a lot of companies by your business broker?

A Yes, sir.

Q Do you recall that Mr. Kelly asked you a number of questions about an ad that appears in Plaintiff's Exhibit 7 on page 180, and I believe it was an ad for -- what company was it, if you recall? It might have been 181. I am sorry.

A It may have been both.

Q On that page, on page 181, is an ad for Advanced Products, and then there is an ad for Magnatec?

A Yes, sir.

Q I believe he asked you some questions about the Magnatec ad, about the absence of the term "exclusive" --

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A Yes.

Q -- in there; do you recall that?

A Yes, he did.

Q Now let me refer to page 180, which is the page right next to that, and there is an ad for a particular seal here. What is the name of it?

A Toruseal, DSD Magnatec.

Q Is the term "exclusive" used in that ad?

A Yes, it is.

Q What does it say?

A It says "exclusive circles."

Q Mr. Kelly also asked you a number of questions about Pfizer yesterday, and he asked you one today.

Where is the Pfizer Company located?

A It's in the Wharton Brook Industrial Park, where our factory is, in -- they're actually in Wallingford, because the park is in two towns.

Q But the Pfizer Company shares the same industrial park that Advanced Products does?

A Yes, it does.

MR. SULLIVAN: I have nothing further, your Honor.

THE COURT: Mr. LaPrade?

MR. LaPRADE: Nothing, your Honor.

your office --

THE WITNESS: No.

THE COURT: -- first?

THE WITNESS: I don't believe he did.

THE COURT: As I understand it, in late 1972 and early '73 you decided with your appropriate staff that perhaps you ought to go into the metal forming C-seal business --

THE WITNESS: Yes, sir.

THE COURT: -- is that correct?

THE WITNESS: Yes, sir.

THE COURT: I take it the usual course of your business operations is that decision is made after discussion, after somebody gives a report, and you make a decision that financially this is what your company should do?

THE WITNESS: Yes, sir.

THE COURT: Is that generally --

THE WITNESS: Yes, sir.

THE COURT: -- the thinking of an officer --

THE WITNESS: Yes.

THE COURT: -- chief executive officer?

THE WITNESS: The sales department, of

course, is always pushing for more, always, and so, if you agree with 'em, you start to work on it. And, of course, our company just involves really Art Hostage and myself on the major decisions.

THE COURT: And one of the considerations, I suppose, before any decision like that is made, is finances, what is it going to cost us; is that correct?

THE WITNESS: Yes, sir.

THE COURT: Is it going to be profitable for us to go into this line; is that true?

THE WITNESS: Absolutely.

THE COURT: Isn't one of the factors that go into that type of thinking a projection on how much it will cost us to go into that business, how long it will take, do we have to hire skilled people that we don't have in our plant, can we use people in our plant, making O-seals, to make C-seals, et cetera, et cetera, et cetera? Isn't that the type of thinking that goes on?

THE WITNESS: Absolutely. The sales department, as I said, has always been pushing for that sort of thing and in the past has been pushing us to make other things, and considered it and turned it down because of the total cost.

THE COURT: All right. In the C-seals?

THE WITNESS: No, on other items that they thought we should start to make.

THE COURT: Prior to this time we are talking about, this time span, late 1972 and early '73, prior to that did you ever decide that you should go into C-seal business by metal forming process and then discard it for any reason?

THE WITNESS: No. Every time a customer wished us to make some -- and they really, literally, insisted that they make some because they couldn't get a delivery -- this happened a few times, only a few -- each time it happened, the sales department was coming and saying "We've got to make these, and we can't be competitive by making them from tubing; everybody in the whole place knows that."

THE COURT: So, I am saying, did that ever happen prior to 1972 and '73, where you met with your partner and discussed it and said, look, we should go in the C-seal business but it is not financially feasible? Did that decision ever --

THE WITNESS: No, it was more of a case of just discussing it, Arthur saying we ought to make 'em and I just putting it off for various reasons.

THE COURT: Then do I understand that in late 1972 and early '73 your sales department finally convinced you that it would be profitable from their point of view if you went into the C-seal business, that they could sell these C-seals in the marketplace?

THE WITNESS: Yes, except I didn't need much convincing at that time. I was seeing the inquiries coming in with tabulated drawings in quantities of fifty to five thousand. I was learning periodically that Pratt & Whitney, for example, had taken out a metal O-ring and put a C-seal in a particular application that we had.

THE COURT: So, from whatever sources this input came, around late 1972 and early '73 you were convinced that there was a market for

C-seals that you should carefully survey?

THE WITNESS: Absolutely.

THE COURT: Then wouldn't it be so that the only reason you would not go into the C-seal business, taking into account the business you were in, your own particular talents and talents of your staff, would be that the finances, the economics, to go into that business were too high? Wouldn't that be a major reason why you would not go into it?

THE WITNESS: That would be -- have been the major reason, without question.

THE COURT: So, then, do I understand that in and around January of 1973 a decision was made that the economics of the situation were such that you should go into the C-seal business?

THE WITNESS: I could almost say that we were -- felt that we were forced, with the erosion of the metal O-rings business and the additional competition.

THE COURT: To go into the business?

THE WITNESS: That we had to go into it.

THE COURT: In my opinion -- if I am

wrong -- because I am not a businessman -- there is only one way that that decision could be made with confidence, and that is that projections were made as to the cost of going into the C-seal business, the amount of time it would take you to go into the C-seal business, the staff that you would have to hire to go into the C-seal business, whether you have to get outside help or use your help that you already had, equipment that you had to buy, to use the equipment for the O-seal business, and so forth; is that correct? Do you agree with me on that?

THE WITNESS: Yes, sir, except that in a very small company these things are not done in a formal, thoroughly detailed plan. They're basic assumptions and guesses and frequently not written down, as you would have to do in a large company.

THE COURT: I recognize that, and I am not going to say produce the documents. There are two aspects of that. A big company probably puts everything down on paper, more apt to take a chance; a small company probably is not apt to put everything down on paper, particularly when there are only two partners, but are less likely to take a chance, because if they make a mistake the whole business may go down the drain.

With that in mind, what is your best recollection of what your projection was with respect to those items I mentioned. what your projections were with respect to those items I mentioned, in around January, February, March of 1973?

THE WITNESS: The projection of sales?

THE COURT: I am more interested in the time to manufacture a C-seal, get it out to the market, the costs, whether you had to hire new people, whether you could use your staff. I mean didn't you and your partner say "Okay, if we're going into this business, it looks like we'll have to buy a new adding machine" -- just to keep away from welding machines and everything -- "we'll have to get another secretary, we'll have to" -- and then work right down with me as far as your projections.

THE WITNESS: Well, from the standpoint of the indirect cost to us, such as secretaries and so forth, that kind of thing was not a consideration.

THE COURT: I understand. I just want to stay away from a particular item that involves the C-seal business.

THE WITNESS: We decided to go -- to make them by something other than cutting 'em out from metal O-rings, basically, but that's not a firm decision. The discussions that I was having with Ken Bell and Bernie Sniegowski were to arrive at some feeling for what method we would use and what were the costs -- what the costs were likely to be. If those costs were much more than we had thought, I would immediately have gone back to Art and said "This thing is going to cost us 10,000; we thought maybe we were talking two or three."

As far as personnel is concerned, we felt that we would squeak it out with Bernie, Ken and myself from the engineering and using our shop and the personnel in the factory, because to form the C is such a small part of the total process. We were considering that the only people we would really need would be some more production people to actually do the work.

We recognise a training period, working again with the engineers and the toolmakers who would build equipment, would also teach the operator how to use it, because that's the process. You design it, they build it and they make it work, and you debug it. So, then, the toolmaker frequently would be the fellow who would teach the first operator how to use that piece of equipment, and then it would travel on from there.

So personnel again was not a problem. We recognized some time to training 'em, to break 'em in, but immediately they become productive, and again it's just a few operations. From there on, everything is handled side by side with the metal O-ring through our factory.

THE COURT: How about time?

THE WITNESS: Time to do it? Well, that's what we were -- that's part of the discussions I was having, as to just how long we thought it would be.

THE COURT: Do you recall what your best estimate was before Kramer came on the scene?

THE WITNESS: Well, by the time David

came on the scene I had roughed out in my mind that if Bernie was -- would be primarily -- be responsible for it and had to do it on a part-time basis, it would probably take him four or five months to get to the point where we could start to actually produce them and advertise for sale. If he went full time, he would have had a couple of months, but, at the same time, we probably wouldn't have found presses and equipment, so it still would have taken two to three months then.

THE COURT: Are you telling me that really Mr. Kramer did not help you that much, because it took him four or five months to put you into production?

THE WITNESS: I am, your Honor. And one thing that -- when Mr. Kramer came with us, he spent a considerable amount of his first month or two learning what we were doing in metal O-rings so that he could coordinate; and also we have some problems still in the manufacture of metal O-rings and I asked him in his training program to take a good look at each operation and I'd be happy to listen to any suggestions he

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had for improving our present method of making metal O-rings.

THE COURT: All right. Now my last question:

If a hypothetical member of the board of directors came to you and said, "Look, I agreed to go into the C-seal business with you and I approved that this company do that, and you told me that you could eke it out with yourself and Bernie and a few of the others; the next thing I know you hire this high-priced expert from Pressure Science. What changed your mind? Why do we need a $22,000 new man? What's he going to do for us, after you represented, or at least indicated, that you could do it with our staff?" -- what would your answer have been, in and around May and June of that year?

THE WITNESS: Well, as a matter of fact, we almost didn't hire him because he was -- we were looking at a $26,000 salary, and we said we can't even afford another man, but -- and we certainly can't pay that much, but if everything goes well we will offer him 22,000. We were very optimistic about purchasing B. G. Peck. We

* * * * *

2. Mr. Sommer was then called as a witness by Advanced Products, and testified as follows: that he graduated from the Massachusetts Institute of Technology in 1944 [1286]; that prior to founding Advanced Products in 1954 he was employed as an engineer for two industrial concerns and DSD-Magnatech, another manufacturer of metal O-ring seals [1286-88, 1291], and that he was a member of the board of directors of the American Association of Industrial Management, Connecticut division, Projects, Incorporated of Galstonbury, Connecticut and the Lee Company in Westbrook, Connecticut [1291]. Mr. Sommer further testified in part as follows:

* * * * *

Q When was that?

A Several years ago. I guess four, now.

Q How does Advanced Products rank in terms of sales with respect to the competitor companies that you have just identified?

A We're quite sure that we're the largest, by far.

Q When did Advanced Products first manufacture metal C-rings?

A I believe four or five years ago.

Q Approximately 1970, '71?

A Around there, yes.

Q Can you tell me why Advanced Products first manufactured MCR's?

A Just because a customer was practically insisting that we make some for him. He recognized that we could cut them out of metal O-rings and wanted us to do it.

Q Can you describe for me the method of manufacture of those MCR's?

A Start with a completed metal O-ring, but, of course, you would have no surface finish, just a plain metal O-ring, and then make a fixture to go into a lathe or a milling machine to hold it securely while you cut out the portion that wasn't required, either the inside or the outside or the face of the metal O-ring.

Q If you cut out the inside of the internal seal, the outside external face would give you an axial seal?

A Yes.

Q What did you do thereafter?

A Once that's cut out, then whatever was required after that was handled just like a metal O-ring.

Q So you heat-treated in the same way?

A Yes.

Q Polished in the same way?

A Yes.

Q Electroplated in the same way?

A All the same.

Q Packaged in the same way.

At some point did Advanced Products begin to consider increasing its volume of MCR production?

A The activity seemed to increase at the end of '72 by our customers. We were starting to get more requests for metal C-rings, and at the same time we found that we had two new competitors that I've already mentioned, American Seal Company and Vac-Hyd, and also that we were losing many of our applications to the metal C-ring. Pratt & Whitney had replaced quite a few of our metal O-rings with metal C-rings.

So we decided --

Q Did customers also request it; do you recall?

A Customers were also requesting it. As I said, we were getting more inquiries from customers with some sizable quantities, and they were asking us to make 'em a seal, give 'em a price.

So we decided to proceed in that direction.

Q Fixing as a point in time the first part of 1973, can you give me the capitalization of Advanced Products at that time?

A Approximately 600,000.

Q How many graduate engineers did Advanced Products have on its payroll?

A Three, including myself.

Q Would you identify them for me, please?

A Myself, Bernie Sniegowski and Kenneth Bell.

Q At the time Advanced Products began to consider increasing its MCR volume, did it at that time also consider changing its method of producing MCR's?

A Well, we recognized we couldn't be competitive --

Q So the answer to the question is "yes"?

A Okay.

Q Why?

A Because we recognized that we could not be competitive using metal O-rings as a basis for making metal

C-rings -- the costs were much too great -- and that we had to make 'em by starting out with sheet or strip and forming them more expeditiously.

THE COURT: Even though you did not know how the metal formed C-ring was made, you knew it was cheaper?

THE WITNESS: Oh, without question. The difference between tubing and strip is tremendous. Plus we have to do almost the same operations, plus the fixturing of a metal O-ring to cut it out is expensive. It's almost as expensive -- in fact, some cases, more than making a die, just to hold the ring while you cut it.

BY MR. SULLIVAN:

Q When you began to consider getting into the market on a greater basis, what did you do?

A Well, I started having conversations with our other two engineers to determine a direction that we should go. The conversations, of course, most of the time revolved around the two things that we weren't doing. One was welding bands and the second was the forming in a die.

We knew we were going to do all the other operations the same as metal O-rings in boxes, side by side;

they were handled the same way. So we had only those two areas to consider. We also recognized that in the large diameters that we would be roll forming and that we had the equipment in house to do that except to make the rolls.

Q What was the equipment in house you had?

A Well, we had some small rollers and we also had a large roll former that we were using on the metal O-rings which just involved putting on shaped rollers to form the large rings.

Q Where would you get those shaped rollers and what would they cost?

A Well, we'd machine them in our own toolroom or have them machined by a subcontractor, and for each size several hundreds of dollars.

But that really presented no particular problem, because for each free height you only needed one set of rolls, and we could make any diameter ring. So that we could go all the way up to twenty-three feet if we wanted to in the depth that we were making the metal O-rings. That was the least of our problems and the one we didn't spend very much time on at all.

Q When you began to have these conversations -- and I am pushing you all the way back to when you first had them, these conversations with Mr. Bell and Mr. Sniegowski --

when was that again?

A Well, early '72, probably around February, where we had made some rings for -- some C-rings out of metal O-rings for Pratt & Whitney and we --

Q Early 1972?

A '73, I'm sorry. Sorry, '73.

Q What period of time did these conversations cover?

A Well, from then until May, the middle of May --

Q When you first began to have your conversations with Mr. Sniegowski and Mr. Bell, can you, starting at the beginning, tell the Court what you considered and why?

A Well, we were primarily discussing the forming. In early discussions, even preliminary discussions, we recognized that we had no particular problem with any part of finishing, but the only thing we had to do was make a formed ring. We also recognized that building a TIG welder to weld the band would be about half the problem that it was to design and build a resistance butt welder, because the resistance butt welder is far more complicated -- i. e., that to weld a tube -- than to weld a band, wherein you cannot only clamp it up securely on both sides but you can provide a backup gas in back of the weld. Now, you only had to traverse the torch across a straight line rather

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than make it go around in a circle.

So that this was not our primary consideration. We recognized that it would probably cost us half as much as making a butt welder, and the primary concern then was which die forming method.

We discussed whether we should start with single bands right away -- that is, a band of a single width -- or whether we should buy wider -- plan on buying wider sheet and welding a sheet, like six inches long, and then slitting it up into individual bands.

But we were just basically limiting our discussion, therefore, to the method, whether we went to this stripper sheet and whether -- which type of die forming we would use, recognizing that at some point our press would not be big enough and we would go to roll form.

Q Could you describe to the Court and list for the Court the die forming methods you discussed in 1973?

A Well, we discussed very quickly and discarded almost as quickly explosive forming, because we found that -- we knew that each die would cost too much, hydraulic forming, because we felt those dies would cost too much and it would be something of a messy problem and wasn't necessary. So -- we even discussed spinning a little bit, but recognized that also is a problem because you have to use some kind of removable split pieces --

Q What is spinning?

A -- if it worked.

It's to form a metal over a male part, or it could be female, but just actually with a tool, make the metal follow the contour while it's spinning.

But we were afraid that would -- we couldn't make the split pieces to go in inexpensively, and also we couldn't -- we might have some wrinkling problems; so we were really trying to decide whether we wanted to go to stretch forming or just straight die forming, or which to start first.

Q With respect to the rubber press forming, you were actually considering that?

A Yes. Bernie was pushing quite hard to do it. He had quite an experience in it. I was not that excited about it because I just thought we could do without it. But in high quantity production it made it a viable way of producing pre-forms.

Q Can you tell me why you were not excited about rubber press forming and why Mr. Sniegowski was, if you recall?

A Well, I think because he had a lot more experience with it, for one thing. He knew what it could do. And I had none with rubber stretch forming. I was looking to make the perfect C-shape and recognized that, if you want that, you have to pre-form the edges, because the ends will not form unless they're squeezed tightly between two mating parts; otherwise, we would have a little straight section in there. And at that time I was very interested in having it a perfect C.

So I felt that we had to go to something like the rolling pre-former, where we could squeeze it very tightly; and the roll pre-forming means, again, you only need one set of tools for each free height, whereas rubber pre-forming, for example, you have to have one for every ring diameter.

Q What were you thinking about as opposed to rubber press forming at this time?

THE COURT: When you say "at this time" -- what time?

MR. SULLIVAN: February through May.

BY MR. SULLIVAN:

Q And if the times are any different, I would like you to indicate.

A No, we're talking about February through May.

Q 1973?

A The middle of May, in '73.

Well, really, that's about the extent of my feeling about it. I wasn't saying no, I wasn't saying yes, to Bernie. I just felt that it perhaps would be better to start without it. But that really was the extent of my feelings.

Q Could you describe for the Court what considerations entered into your mind, if they did, with respect to available tooling, equipment and potential cost for equipment and tooling?

A Well, in looking over the entire situation as we went along, although we never conscientiously sat down and wrote out the dollars, but -- because we hadn't really decided to spend any, anyhow, by the middle of May we knew that the only equipment we needed was the TIG welder, and that was probably half the cost of one of our resistance butt welders. We needed -- the other big expense would be a press, and just roughly figured that we would buy a used one in terms of a few, several, maybe four, five thousand dollars, perhaps. The smaller equipment was obviously in the -- few pieces of smaller equipment were obviously in the -- didn't -- several hundred dollars each; maybe four, five hundred dollars would cover all the small bits and pieces. The TIG welder would not cost us very much because we would do it in our own machine shop and fit it in amongst other jobs. And we already had the lathes and the milling machines and the grinder and everything we needed to make all these things, which we did.

Q Had you actually decided to go to use TIG welding as opposed to some other form during those conversations, if you recall?

A That was almost an automatic thought. There really is no other way that would be as viable,that I know of today, for the problems at hand, small quantities, millions of sizes, and so forth.

Q Can you give the Court some idea of what an outside range of the anticipated costs were in terms of the things you had to do to start forming MCR's?

A We figured that it would be something between ten and fifteen and probably not get up to fifteen thousand dollars.

Q What would those costs cover? What did you figure in there?

A Well, they would cover a TIG welder, a press,and some small rolling equipment and a shear, the latter two items being very reasonable; they're not very sophisticated pieces of equipment.

Everything else we had.

Q When you say everything else you had, what are you referring to?

A Well, from the standpoint of finishing rings, that all that equipment's there, plating, polishing, tumbling and so forth. From the standpoint of building the TIG welder and making the dies, et cetera, we had the toolroom, which was capable of doing that.

Q If you can approximate for the Court, what would be the cost of setting yourself up if you had to go out and purchase the equipment necessary to finish the formed C once you had it? That is the equipment you just testified you already had. Can you put a figure on that?

A Well, that would include buffing, tumbling, plating. That's probably in the -- I guess twenty, twenty-five thousand dollars, to equip yourself to do those finishing operations. It might not even include large heat-treating furnaces, and it wouldn't include roll forming equipment, which we already had.

Q As the discussions continued from February through May, did you, yourself, on the basis of those discussions, form an opinion as to the way you would like to see the company start if it decided to form a C?

A Yes. By that time, roughly, felt that we would try first without the rubber forming, just trying dies, but would try pre-forming the piece and using a roll forming to pre-form the band before we put it into a die.

Q Would that be for smaller sizes?

A Only the small sizes. The large sizes we didn't really have any question about. They were going to be roll-formed --

Q Why is that?

A It's such a -- well, number one, it's obvious we can't die-form a large piece, because we would never buy a large press. Even if we had a large press, the cost of a die of, say, three, four foot diameter, would just be fantastic. If there was really a tremendous quantity of one size it might be viable, but unlikely that would happen.

Roll-forming equipment is -- well, actually, for us, only meant buying some rolls or making some rolls, and that we were in a position to make any size, we had the room and the space, because we had big metal O-rings all over the room and we can't subsequently plate them or anything else the same as we did with the O-ring. So the forming was no discussion. To form a straight strip into a C cross-section is one of the simplest things that they do in roll forming of metals.

Q So, if I can summarize your testimony, you felt for the larger sizes you would definitely roll form because you did not want to invest in a press; is that right?

A It would not be economical.

Q And you felt for the small size you would use a die.

What kind of die?

A Well, whether it be rubber or -- press -- or just a plain die, that would be a small die. It obviously could not be an expensive die, because every time you have a new size you are going to try to get the customer to pay for it, and if you are going to ask him for a thousand or five thousand dollars every time he wants a new size ring, you are not going to sell it. So it had to be a die that was worth at the most several hundred dollars.

Q With respect to the process after you got your formed C you did not give that much concern because you would treat it like an MOR; is that correct?

A Yes, sir.

Q And you had that equipment in house?

A We were doing it.

Q You had made finished MCR's when these discussions were going on, machined MCR's?

A Yes, that's true.

Q You testified that these discussions covered a period of months from February through May.

Did your discussions ever get out of the

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discussion stage?

A No. That --

Q Why?

A That's not really a very long time, and during that period of time I was in Asia for one month and at the same time I was actively involved with a business broker in an attempt to buy the B. G. Peck Company; and then May 15th, when Dave Kramer called me on the phone, I stopped negotiations -- or discussions -- with Bernie because, if Dave was going to come with us, he could go get on these other jobs and not worry about this problem.

Q What sort of workload did Mr. Sniegowski and Mr. Bell have during the time period we are talking about, February through May?

A Well, Mr. Bell is pretty much tied up all the time with customer applications and the nuclear pressure vessel rings, so he keeps very busy on that. The sales department is continually haranguing him for information.

Bernie Sniegowski is not only a project engineer but he's quality control manager and troubleshooter for any problem we have. He's completely responsible for the technical end of the plating. We have two plating lines, and every time there's a problem there somebody is after him. He's our expert in welding. Whenever there's a welding problem in the TIG welder he's the one that goes out and actually gets the problem solved. So that was true of Bernie then and it's true of Bernie today. He's a very, very busy man.

Q Did you feel that either Mr. Bell or Mr. Sniegowski had sufficient time to devote to the MCR forming effort?

A Well, it wouldn't have been Mr. Bell, anyhow, and I didn't feel that Bernie had sufficient time, but if I asked him to do it he would have accomplished it; and I sometimes wonder how he did all these things that he does.

Q Do you recall at some point receiving a memorandum from Mr. Sniegowski, which has been marked as R in this case?

A Yes, sir.

Q Can you tell me whether you requested that memorandum?

A No, I did not request it.

Q Do you know why Mr. Sniegowski submitted it to you?

A Yes.

On the 15th, when I stopped talking about the metal C-ring, he, I guess in some frustration, decided that he'd summarize everything and see if I could get the thing started, because he was very interested to see it happen, as well as I was.

Q Does that memorandum set forth the methods used by Advanced Products today to weld and form its MCR's?

A Basically, yes.

Q Are there things not covered in there that you do today?

A I don't think planishing was in here, if I recall. But the basic procedures are in here.

Q Do you recall whether there is any reference in there to end craters and solutions?

A Well, there isn't a solution to the end crater problem in here, but Bernie was only flagging up the problem. It didn't concern me, because I had had experience with TIG welding -- or not TIG -- with electron beam welding, where we had end craters both starting and ending and we had dummy tubes to be thrown away with the bad crater in them; and so that did not flag up any particular problem.

Q Where did you have that experience, Mr. Sommer?

A The electron beam was in the laboratory at Hamilton Standard, when we were considering buying an electron beam welder, and we did some experimental work in their laboratory.

if he came with us we would be making it by the more expedient method.

BY MR. SULLIVAN:

Q His Honor just asked you a number of questions. Is it fair to say when you were talking to Mr. Kramer you did not have a whole lot of unanswered questions as to how you were going to form these metal seals?

A Well, that's certainly true, as summarized basically in Bernie's memo.

Q You had decided to die-form and roll-form?

THE COURT: Yes, but, you see, you had not received this memo yet.

THE WITNESS: But that is only a summary of our discussions prior to the time David came.

THE COURT: Oh, I see.

THE WITNESS: This starts out with a summarized item.

THE COURT: I misunderstood something. I thought Mr. Sniegowski was pressing for a rubber die system.

THE WITNESS: Well, as Bernie described to me afterwards, this memo was written by him and -- because I had stopped talking about metal C-rings as of May 15th, when David called, and we must have had the meeting that he describes two weeks prior, because I had only gotten back from Asia the 27th of April, as I recall. So we had a meeting sometime from the 27th of April until the May 15th.

Now, I know definitely May 15th I stopped talking to him about it, because there was the possibility that David would come, and Bernie could stop wasting -- not wasting his time, but he could stop spending time on this. Now, he was sitting waiting, and I wasn't asking him to come on back and let's decide what we're going to do, so he wrote that memo. But that's only a summary of what we both knew and talked about up until that time, including me. Well, he may have thrown in a few more things that we hadn't discussed; I don't know. But when you write these down you are a little more precise.

THE COURT: The metal forming procedure as set forth -- is that the same as rubber press forming?

THE WITNESS: I'd have to --

MR. SULLIVAN: Here, I will give you mine.

THE COURT: You see, in paragraph fourteen he says, "I've completed a complete plan to start rubber press forming." Is that the system you thought you were going to use before Mr. Kramer --

THE WITNESS: No, the rubber press -- no, although it's rather similar as -- the rubber press forming is the one that I was not in favor of, because I didn't think we had to go to that number of steps. I was more in favor of his step which is on page 2 at the very bottom, which is only the end result. Above that there are a couple of other possibilities.

THE COURT: Subsection four?

THE WITNESS: Yes, sir, the very last sentence, and above that it refers to the preform, which is the thing that I wanted in order to get that perfect C. So my direction was more in favor of that one.

THE COURT: All right. So do I understand that at least with respect to dies Mr. Kramer never said to you at this May 22nd meeting "We use a die set split," and you never said to him "Do they use rubber press or do they use a die set split or do they use some other set?" Nothing was ever talked about --

THE WITNESS: That's absolutely true.

THE COURT: -- along those lines?

THE WITNESS: I would never ask an interviewee, anyhow, what we were doing at a company. Even if I wanted to I wouldn't ask him. I might after he was employed, but I would never do it in an interview, because they might fear I was just trying to pick their brains and they might walk out. I would never ask him, never have.

THE COURT: How about on June 1st, when was was employed?

THE WITNESS: I really didn't want to know, really on the basis -- I just don't want to know. I'm sorry I know so much as a result of this trial. I'd rather do it with the people we have.

THE COURT: All right.

BY MR. SULLIVAN:

Q Let me show you a card and ask you if this refreshes your recollection as to whether Mr. Sniegowski was in the plant on May 22nd.

A I guess he was not.

Q Why do you say that?

with Mr. Kramer?

A Just Art Hostage and myself, and we met and we --

Q Where did you meet with him?

A In my office.

We told him that we were very interested. We, I'm sure, repeated the problem of going to Peck. We still weren't sure, but it was still looking very good, and if he was interested we'd like to have him come with us. We couldn't afford the full salary, and we made him the offer of 22,000, and he accepted it.

Q When you made Mr. Kramer the offer, was it your understanding that he was still working for PSI; do you recall?

A I'm quite -- I still don't know about that. I've testified to that before. I'm not sure whether I knew he had left PSI then or not.

Q You at some time concluded that he had left PSI, I assume?

A I think I thought then that he was going back and give 'em some notice and come to work, I think.

Q In any event, you did not know Mr. Kramer had been involuntarily terminated by Pressure Science?

A That's true. That's definitely true.

Q At any time during your talks with Mr. Kramer

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either on the telephone or in the two interviews, did you ask Mr. Kramer whether he had signed a nondisclosure agreement with Pressure Science?

A No, sir.

Q Can you tell me why you did not ask him that?

A Well, he said that he was very interested in staying in the seals business because it was fascinating to him, that he was -- he wanted to do the things that he wasn't allowed to do at PSI, and there was nothing limiting him, such as trade secrets or confidential or exclusive or something in that term, to prevent him from continuing in that endeavor with some other company.

Q Have you ever asked an employee that you have interviewed whether he signed a nondisclosure agreement?

A No, sir.

Q I believe you previously testified that you did not check up on Mr. Kramer's academic credentials; is that correct?

A That's true.

Q Have you ever checked up on an interviewee's academic credentials?

A The only one was a man we were hiring or hoped to hire right out of school, first job. That was the only one.

Q With respect to people that had graduated from school for some period of time, have you ever done that before?

A No, we have not.

Q Did you treat Mr. Kramer any different than you treat any other job interviewee in terms of checking up on him or --

A No, there's no difference, no.

Q I believe you testified that once you started to talk to Mr. Kramer you stopped talking to Mr. Sniegowski about metal C-ring -- why did you do that?

A Well, if Dave Kramer was going to come in and take over the manufacture of metal C-rings, Bernie and I didn't have to work on it any longer.

Q After you made the offer to Mr. Kramer, do you recall when he accepted it or do you know whether he accepted it at that meeting or thereafter? Can you tell me?

A He accepted it at that meeting.

Q When did Mr. Kramer report to work?

A On the 18th of June.

Q What was Mr. Kramer's job title or position?

A Project engineer.

Q Who did he report to?

A He reported to me.

Q In your conversations with Mr. Kramer after he joined you and youdiscussed with him how metal C-rings would be formed, did you in those conversations learn anything surprising or something that would cause you to say "Hey, I hadn't thought of that before"?

A No, I did not. In our conversations about the process that he was using to start our manufacture, there was nothing that we had not discussed with Bernie and I together, and there were absolutely no surprises.

Q Focusing now on the time when this lawsuit was commenced and in the course of discovering and indeed in the course of this trial, you have learned a great deal about how Pressure Science manufactures MCR's; is that correct?

A That's correct.

Q Have you learned anything that you did not know before?

A I didn't know before how they -- what process they were using, and I learned some things they were doing that we weren't doing.

Q What are they?

A The planishing for stress equalization or stress relief.

Q Planishing or pulse plating?

A Pulse plating.

I also learned that they were using a crowned anvil for planishing, and I also learned something about their welding fixture, including the fact -- or the design of their multiple fingers.

Q You did not know that before?

A I did not.

Q With respect to the pulse plate, just so there is no confusion, you do pulse plate, say, in the MOR, but for sizing, not stress relieving?

A Yes. We call it spanking.

Q But you never pulse plate and you never considered pulse plate to stress-relieve; is that correct?

A That is true.

Q You do use anvils, but they are not shipped as the Pressure Science anvils; is that correct?

A As I understand their description of theirs, ours is not like theirs.

Q You do have a welding fixture, but it is a solid as opposed to independent finger welding fixture?

A That is true.

MR. KELLY: Your Honor, I cannot hear the witness, I am sorry.

Q David Kramer is still employed by the Advanced Products Company; isn't he?

A He was thinking of rubber press for some aspects and I was not desirous of rubber press.

Q I believe you were quite specific yesterday that on May 15th you stopped talking to Mr. Sniegowsky about making C-seals; is that correct?

A I testified that I -- my recollection is only that from that time on I knew why I didn't talk to him.

Q Oh. Okay. From May 15th on you did not talk to Mr. Sniegowski about C-seals; correct?

A Well, until sometime. Yes.

Q With respect to these ongoing discussions that you were having, you did not talk to him any more in that vein? You did not talk to him with the idea in mind that he was still going to make them; right?

A That's true.

Q Because you knew David Kramer was coming in; is that right?

A I thought he might.

Q Please?

A I thought he might.

Q You thought he might around mid-May, and a couple weeks later you knew he would; right?

A Yes.

Q This memorandum was unsolicited by you; was it,

Mr. Sommer?

A That's true.

Q Isn't it true that Mr. Sniegowski was a little bit upset because you had not talked to him any more about C-seals, and that is why he produced this memo, because he was eager to get into it?

A I think he was eager, but I don't think he was upset.

Q Maybe he was not upset.

A I don't know. Maybe he was.

Q All right. But, at any rate, he did produce this memo around May 31st?

A Yes.

THE COURT: Before we get off paragraph eleven-four, had you noticed that statement at the bottom of page 2, "See my layouts blank and blank for further details"? Had you noticed that in this memo?

THE WITNESS: When I read this the first time, your Honor?

THE COURT: Yes, or any time.

THE WITNESS: Well, subsequent, yes, but at the time I read it the layouts weren't included with it.

THE COURT: I see.

THE WITNESS: And the next day we hired David Kramer.

THE COURT: Are these the layouts on the back, attached?

THE WITNESS: That's some of the sketch work, but those aren't the numbers he was talking about, and I did not have those at the time I read this memo. The next day we hired David Kramer, so I never went back to this; in fact, forgot this until this action started -- this memo.

THE COURT: One way to interpret that language is that he is telling you to "See my layouts"?

THE WITNESS: He is.

THE COURT: Oh. And I am saying what is he talking about, if you know.

THE WITNESS: Yes.

THE COURT: The thing that is attached to the back of this?

THE WITNESS: Yes, sir. I believe so. This was only some sketches that he had but did not present to me on May 31st with the memo.

THE COURT: All right. Now I understand. The layouts that he is referring to are attached to the memo: is that your understanding?

THE WITNESS: Yes.

THE COURT: Okay. Thank you.

BY MR. KELLY:

Q Mr. Sommer, would you look at the layout that is attached to the memo. Would you call that a layout, Mr. Sommer?

A Not really, no.

Q By the way, paragraph eleven, sub four, refers to "layouts"; does it not?

A Yes.

Q What would you call that attachment to the memo?

A Just some hand sketches.

Q Hand sketches?

A Yes.

Q Does that hand sketch that is attached to the memo give details of dies?

A Not really.

Q Not really?

A No. It doesn't.

Q It does not; isn't that true, Mr. Sommer?

A It doesn't.

Q Did you ever see the layouts "blank and blank" giving further details with respect to the die --

A No.

Q -- in conjunction with this memorandum?

A No.

Q Now go to paragraph sixteen, Mr. Sommer.

Does paragraph sixteen explain how the Advanced Products Company proposes to weld its slugs?

A Hot it proposes to weld its slugs? Was that your question?

Q Is that explained in paragraph sixteen?

A No.

Q Paragraph seventeen does present five paragraphs that are referred to in the conclusions and summary; is that correct, Mr. Sommer?

A Paragraph seventeen?

Q Yes.

A Yes.

Q I take it that these are questions that had not been decided yet; is that correct, Mr. Sommer?

A Nothing had been decided, Mr. Kelly.

Q At the time this memo had been written; is that correct, Mr. Sommer?

A Yes.

Q That would be on May 31st or June 1st, 1973, Mr. Sommer; is that correct?

A Correct.

Q My final question, Mr. Sommer:

If you look at paragraph seventeen F, it refers to layouts and preliminary sketches for a meeting at your convenience.

Did that meeting ever take place, Mr. Sommer?

A No, it did not.

MR. KELLY: Excuse me one moment, your Honor.

THE COURT: Yes.

BY MR. KELLY:

Q Just a few questions remaining, Mr. Sommer:

With respect to Exhibit 11 -- and maybe your counsel has another copy -- the damages -- oh, double I, excuse me --

MR. KELLY: Is there an extra copy that Mr. Sommer could refer to?

Q Will you take the exhibit, Mr. Sommer. I just want to clarify my understanding of what this represents, Mr. Sommer.

Where did Exhibit double I come from? Was it prepared at your company?

Q Mr. Sommer, the question was: You are not sure what those 20 hours represent; are you?

A Precisely, no.

Q Then there are some rather large figures on research by Mr. Kramer, Mr. Sniegowski and yourself. What kind of research was this?

A Times in libraries searching literature.

Q What kind of literature?

A Textbooks.

Q What kind of textbooks, Mr. Sommer?

A Technical textbooks to --

Q Relating to welding, Mr. Sommer?

MR. SULLIVAN: Your Honor, I would prefer that Mr. Kelly let Mr. Sommer answer the question and not interrupt him.

THE COURT: Did you finish your answer?

A Textbooks relating to all aspects that Pressure Science claims are proprietary, including welding.

Q Let me try it by asking you direct questions, Mr. Sommer:

Mr. Kramer shows 160 hours of research through April 8th; is that correct?

A Yes.

Q Mr. Sniegowski similarly shows 160 hours of research through April 8th; correct?

A Yes.

Q And you show 178 hours of research through April 8th; is that correct?

A Yes.

Q That is a total of 498, as I make it, hours of research?

MR. LaPRADE: Objection, your Honor. That is not what the exhibit says at all. It says research and trila, not research.

MR. KELLY: Excuse me.

BY MR. KELLY:

Q Some of this is trial time?

A Most of it is trial -- is trial time.

Q All right. Let's just talk about the research part.

How long had this research been going on?

A Since the inception of the -- since the time of the -- the action was brought.

Q Since December 6, 1973?

A Did you say September?

Q No, I said December 6th. I believe that was the date you were served?

A These items are since the -- since the depositions, because up through the depositions the time is all included in the last item in that grouping.

Q I see. There was research done prior to the depositions as well?

A Yes.

Q Was there substantial research done prior to the depositions?

A From -- yes. Not my deposition, but prior to us taking the depositions of --

Q There was some research done prior to your deposition; wasn't there, Mr. Sommer?

A Yes, there was, yes.

Q Who directed that this research be done?

A Myself and our counsel.

Q Did you break down this research into specific areas? Did Mr. Kramer take one area, Mr. Sniegowski another and you a third? How did you attack the problem, Mr. Sommer?

A We took no break -- no specific breakdown.

Q Were you directing this research effort, Mr. Sommer?

A In general, yes.

Q What instructions did you give Mr, Kramer and Mr. Sniegowski?

A To search -- to go to libraries and search for literature that shows that these processes were common.

Q What processes, Mr. Sommer?

A The processes that Pressure Science was claiming were proprietary.

Q When did you give them this instruction, Mr. Sommer?

A I believe it was after the deposition of myself and Mr. Kramer.

Q So after the deposition of yourself and Mr. Kramer you told Mr. Kramer and Mr. Sniegowski to go out and research in general the areas that Pressure Science was claiming to be proprietary; is that your testimony, Mr. Sommer?

A Yes.

Q How did you know after Mr. Kramer's deposition and after yours but before the depositions of Mr. Taylor and Mr. Sadoff exactly what Pressure Science was claiming to be proprietary?

A We were trying to read into your questions what you were considering to be proprietary, because, of course, we couldn't understand what was -- they thought was proprietary. We didn't think anything was at that point.

Q Did you ask Mr. Kramer by that time how Pressure

Science made their C-seals?

MR. SULLIVAN: Your Honor, I would like to make a representation to the Court at this time that during the course of Mr. Sommer's deposition and Mr. Kramer's deposition, as counsel for Advanced Products, to prepare my case, I asked Mr. Kelly on numerous occasions what process they considered to be proprietary and the elements of it, because we did not know, and he told me, and that initiated the research. He sat through the whole thing.

THE COURT: All right. Your comments may be noted for the record.

Goahead, Mr. Kelly.

BY MR. KELLY:

Q Do you recall the question, Mr. Sommer?

A No.

MR. KELLY: Will you read the question.

(The question referred to was read by the reporter as above recorded.)

THE WITNESS: Say that once more.

(The question was again read by the reporter as above recorded.)

A (Continuing) I don't know when I asked him.

Q You do not know if by the time of your deposition you had asked Mr. Kramer how Pressure Science made C-seals?

A I know up until the deposition I did not ask him, or at least until the sheriff was there.

MR. LaPRADE: I am sorry, I missed the last few words the witness said.

(The answer was read by the reporter as above recorded.)

BY MR. KELLY:

Q How many hours, Mr. Sommer, did the depositions, themselves, take?

A I don't know, Mr. Kelly.

Q You do not have any recollection -- I do not mean five and a half hours; I mean can you give an approximation?

A What depositions?

Q The depositions of yourself, Mr. Sadoff, Mr. Hostage and Mr. Kramer?

A Myself, Mr. Sadoff -- I think my own was approximately a day.

Q How about Mr. Kramer's? You remember that?

A No, I really don't. I'm trying to help you.

Q Do you think one day would be --

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A I'm trying -- perhaps.

Q How about Mr. Sadoff's and Mr. Taylor's depositions? Did you attend those depositions at all?

A Yes, I did, indeed.

MR. LaPRADE: We stipulate to that, it seems to me.

THE COURT: What is the purpose of this, Mr. Kelly?

MR. KELLY: All right. He has an overall figure of 490 hours for depositions, and I think some of that pertained to research.

THE WITNESS: Yes, it did.

MR. KELLY: All right.

BY MR. KELLY:

Q So, if we take the deposition time from that 490 hours, the rest of that time would have been research, also?

MR. SULLIVAN: I believe that is what the exhibit says, your Honor.

A Well, research and trial and preparation includes time with our counsel, also.

Q Let me try to get it directly, Mr. Sommer.

The last entry on this first section says "Depositions only." Then there are some initials, and I assume -- you can correct me if I am wrong -- that they refer to yourself, Mr. Sniegowski, Mr. Hostage and Mr. Kramer?

A That is true.

Q There is a total of 490 hours there. We did not take depositions for 490 hours; did we?

A No; that's true.

Q So, if we subtract the time of the depositions, what does the rest of that remainder leave? Was that research?

A It includes some research and time with counsel.

Q On the question of research, can you tell as precisely as you can what you told Mr. Kramer and Mr. Sniegowski to research?

A Any process that we thought at that time Pressure Science was considering to be proprietary.

Q You asked them to find out about welding processes?

A That's part of it.

Q Any particular types of welding?

A I believe at that time we thought the TIG welding process, so I think they were looking for TIG welding.

Q So you sent them out and asked them to research what they could about TIG welding?

A Yes.

Q Your purpose was to show that these things were common knowledge --

A Yes.

Q -- is that correct?

A Yes.

Q Did you send Mr. Kramer or Mr. Sniegowski or yourself to any welding companies at this time?

A No.

Q Did you have any telephone calls or contacts with welding companies?

A I don't know if they did.

Q How about yourself?

A I'm not sure.

Q Again, this was after December 20th, after your deposition?

A Yes.

Q During your research time, you do not recall whether you contacted any welding companies?

A No. I might have.

Q How about research with respect to die forming? Were Mr. Sniegowski and Mr. Kramer asked to find out what they could about die forming?

A Yes.

Q The purpose of this was also to show what Pressure Science claimed was proprietary was actually common knowledge?

A Yes.

Q Did Mr. Kramer or Mr. Sniegowski go to any die forming shops, tool and die --

A I think so.

Q Please?

A I think so.

Q This was under your general direction that they do so?

A Under general direction, yes.

Q Do you know who went to a tool and die shop?

A I think Mr. Kramer did.

Q Do you know which one?

A I don't recall the names.

Q Was there anything else, other than welding and forming, that you specifically directed Mr. Kramer or Mr. Sommer or that you, yourself, checked into, researched?

A I think that the deposition -- we guessed that they were considering punch --

Q Please?

A I think we were guessing that planishing was another item.

Q Planishing?

A Of proprietary -- and they were therefore looking for planishing.

Q That is what Pressure Science has referred to as mashing?

A Yes.

Q That is what you had in mind?

A Yes, yes.

Q So you were also looking for references to techniques of planishing or mashing?

A Yes.

Q How about roll forming?

A Yes. We had some clue that that was considered proprietary --

Q All right.

A -- so they were looking for roll forming.

Q So they were looking for roll forming, mashing, welding and die forming? This was what this research was concentrating on?

A I'm sure of those. Whether there were more or not I don't recall.

Q There may have been a couple more, but those sort of strike you as being central to the research effort?

A Yes.

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Excerpts From the Testimony of
Bernard J. Sniegowski

BERNARD J. SNIEGOWSKI, called as a witness by Advanced Products, being first duly sworn, testified as follows: that he has been employed by Advanced Products since June, 1970 as quality control manager and special project engineer [1500, 1519]; that he received a certificate in aircraft maintenance engineering from Wentworth Institute in 1949 [1500, 1508]; that he obtained a license from the Federal Aviation Agency as an aircraft engine and aircraft mechanic in 1949 [1509]; that he has taken special courses in, among others, applied hydraulics, metallurgy and fundamentals of ferrous metals at the Massachusetts Institute of Technology, the Society for Metals, and the Taylor & Fenn Corporation [1501]; that he attended special welding forums given by the Huntington Alloys Division of International Nickel in 1970 and 1972 [1505]; that he completed special courses in non-destructive testing, most recently one given by the Magnaflux Corporation in Chicago, Illinois [1505]; that he was a special lecturer at the University of New Haven Graduate School, School of Industrial Engineering in the 1971-1972 academic year and conducted a course in "Tooling Techniques" which course included a review of metal forming and fabrication with emphasis on current practical techniques highlighting the present state of the art in the metal working industry [1506]; that he has been a member of the American Society for Metals [1506]; that he received a bachelor of science degree in mechanical engineering from Western New England College in 1963 [1501, 1513]; that he had been formerly employed by Fairchild Aircraft Corporation, Pratt & Whitney Aircraft Corporation, Kaman Corporation and United Engineers as a sheet metal mechanic, mechanical designer, experimental technician and liaison engineer [1509-1514]; that in 1963, upon receiving his engineering degree, he was assigned as manager of rotary production for Kaman Corporation [1513-1514]; and that for three years immediately prior to his employment at Advanced Products, he was employed by DSD-Magnatech, another manufacturer of metal O-rings, as chief engineer [1515-1516]; and that upon his resignation from DSD-Magnatech in 1970 he was a Vice President of the corporation [1518]. Mr. Sniegowski further testified in part as follows:

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customers that were using metal O-rings were very slowly incorporating C-rings into their designs, and they came after us. A good deal of these companies specifically sent in requests for quotes andwere actively soliciting us to get involved in C-ring manufacture, particularly on a way that we could handle a large volume order and so that we could offer these seals at a lower price, competitive to our O-ring; and, in addition, we had been producing C-rings from O-rings in small quantities and selling 'em at a fairly high price. These high prices were permissible to the customer because he recognized the low volume and was willing to pay for the low volume production. Gradually our sales department was noticing an increase of these orders, I noticed it personally, and all of our sales engineers, regional managers, were commenting to us that this activity is picking up.

Q Coincident with that feeling that Advanced Products should increase its MCR volume, was any consideration given to changing Advanced Products' method of manufacture?

A Yes, it was.

Q Can you tell me who was involved at Advanced Products in those discussions?

A Well, as really the only special project engineer

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in the company, I was mostly involved with it, and I would discuss this subject and these methods that we were considering with Harvey Sommer, the president.

Our engineering manager was involved. We discussed it at length. And, of course --

THE COURT: Can you give me a time period?

THE WITNESS: Yes. I would say these discussions were taking place at numerous times in the first months of '73, January into -- through April.

A (Continuing) Our sales engineers -- we have usually two regional managers in the company on a desk at all times. They're taking inquiries over the phone. And, naturally, when they get a request for a volume order of a C-ring, they would immediately get enthused and come and see me and talk about it.

The tempo of discussion was increasing throughout our plant in the early months of May -- of '73.

Q You said you had discussions with Mr. Sommer, Mr. Bell. Did you also have any discussions with Mr. Hostage?

A Absolutely.

Q What was his involvement?

A His involvement was the usual involvement that a vice-president and sales manager would have. The same reports I was getting from his sales regional managers was going into his office, so we had informal discussions on the floor, on the stand. All of these discussions were held while we were all maintaining full-time job assignments in other activities.

Q Can you tell me again in some detail why Advanced Products considered changing its method of manufacture when it decided that it wanted to penetrate the MCR market on a larger scale?

A Well, it was pure economics. We couldn't produce a C-ring machined from an O-ring in a competitive way, not only to be competitive with our own O-rings but with what we assumed were the competitive prices of our then competitor in C-rings, which was Pressure Science. We knew the only practical way to produce a metal C-ring other than from an O-ring was by a metal forming technique.

Q Why did you know that?

A It's just good planning to understand that if you have a formed metal shape it would have to be produced from a band, a band --

Q Let me just stop you there.

THE COURT: Is it fair to say you knew this for years?

THE WITNESS: Yes.

THE COURT: Prior to the summer of 1973?

THE WITNESS: Yes.

BY MR. SULLIVAN:

Q Mr. Sniegowski, you say that it was obvious to everybody you could not produce an MCR that was economically competitive by machining MOR's.

Would you just tell me what you base that conclusion on?

A Well, to begin with, the raw material costs were far greater for a tube than it would be for a comparable length of strip stock. The basic material costs to produce a tube are a great deal higher than to produce a strip. If you are going to make a C-ring from an O-ring, it's obvious you first must make the O-ring, and so that all the material and manufacturing costs related to production of the O-ring are a built-in factor; you are starting out with a selling price of an O-ring, in essence. You take this O-ring and you decide to cut out a segment either on the ID or the OD or the top flange, you must make a fixture to hold this, and again it's a custom fixture. Each of the orders that are usually received are for a specific diameter ring or a specific diameter tube cross-section, which, of course, would correspond to the free height of a C-ring. So there's expensive tooling involved to -- actually, they're holding -- they're holding chucks to fasten the O-ring in a manner supported -- in a manner so that it can be machined. The cost of a machinist is additionally expensive; you don't use an unskilled person to run a machine to cut out an O-ring, so your labor costs are much higher. And when the ring is completed, now you have the addition of expense of tooling and machining costs. With that one exception, all the other work would be identical.

Q So is it fair to say that your labor and material cost if you are going to machine MCR's from MOR's is much higher than if you directly form an MCR?

A Yes, it is.

Q In those discussions that you had beginning sometime in January or early 1973 that went up through April, was there any consideration given in those discussions as to how you would finish the C once you got the C-shape?

A Not very much consideration on that aspect because of the fact we were -- we were producing C-rings from metal O-rings and we were selling these to our customers. So all processes except for the machining of the C from the O-ring were already in existence. There was nothing unique and different; it was routine practice to us.

All the steps of producing a C-ring -- finishing a C-ring after it was cut until the finished product was made were identical to what you use for an O-ring.

Q If you were to put a percentage figure on the whole process as a hundred percent and you put a percentage figure on what percentage was represented by coming up with a shape and then finishing it thereafter, how would those percentages work out?

A If I would assign that percentage, I'd say this production of the hoop and forming the hoop into a band -- into a finished C-shape -- would represent about 10 or 15 percent of the total effort on the project.

Q So you were only considering what would ultimately represent 10 or 15 percent of the ultimate production process?

A That's correct.

Q And the rest of that, either 90 or 85 percent, was something you already had done and you were not concerned with at all because you were going to do it the same way?

A That's right.

THE COURT: Then why did you talk about it for four months? Why didn't you walk in and say "We have 90 percent of this process that I have in the back of my head; I've known it for

THE WITNESS: Yes.

THE COURT: -- in what, thirty, sixty days, did you say? Right?

THE WITNESS: Depending on my effort, my percent of contribution, but no more than thirty to forty-five days.

BY MR. SULLIVAN:

Q At some point in May did you submit -- well, I should show you up here. You have Exhibit R in front of you? You just talked to his Honor about it.

A No, I haven't received it yet.

Q That is Exhibit R. Is that the memo that you wrote to Sommer in May of 1973?

A Yes, it is.

Q Can you tell me why you decided to write that memorandum to Mr. Sommer?

A Well, as I've already explained, and I will repeat it, the sales activity, the increased volume of activity on the floor, the increase from customers, and the general feeling that our seal business -- C-seal business fabrication methods, particularly in forming, had to change.

Q Were you satisfied with the rate that the discussions were moving along at Advanced Products as to when they would start fabricating metal C-rings using --

A No, I wasn't. I guess the word that was used earlier was "eager." I was quite eager to get this C-ring forming program moving, and when I talked to Harv about the details that are in this letter on prior occasions it was apparent to me that he agreed with the intent of everything in this letter, and I was sort of surprised that he hadn't taken the bull by the horns and assigned the project to someone, whether it be me or someone else, but to get it moving.

Q Was one of the problems that Mr. Sommer was away for quite a bit of period of time in the time frame we are talking about?

A Yes, that was the case.

Q Where was he?

A Well, he was on various trips. I believe part of the time he was in Asia, and he was also doing quite a bit of traveling. I had done some traveling during that month of May, myself. I stated I was in Chicago for one week, from the 22nd through the 25th, taking radiographic inspection course.

Q In preparing that memorandum and in your discussions with Mr. Sommer and Mr. Bell, did you draw on any prior experience to come up with the suggestions and input that you contributed to these discussions?

A Yes, I did.

Q What prior experience are you thinking about?

A Well, of course, I had quite a bit of experience at -- as my background indicated -- in metal forming, but particularly I had three years of experience at Magnatec DSD Company. At that company we did a lot of work forming seals from bands.

Q How about at the Kaman Corporation? Did you also have experience that you drew upon at the Kaman --

A Absolutely.

Q Let's start with the DSD Company.

Let me show you what has been marked as Exhibit Q and ask you to describe for me the seal that is represented on the cover of Q.

A This seal is called the Servo-Flex, and the cover shows a picture of the seal, and it is a sales brochure published by the DSD Company. The date on it was February 1967.

Q Was DSD making the Servo-Flex seal when you arrived?

A Yes, they were.

Q Is the Servo-Flex seal what has been characterized in this litigation as an exotic metal seal?

A I would say it is the same family of seal as the a heat-treat fixture on these seals was my idea. But I am also sure that if I had neglected the point, when these seals arrived at the heat-treat subcontracting house, a good, sharp processing engineer there would have called me back and said "We need heat-treat fixtures for these seals," and he would have designed and built his own idea, his own heat-treat fixtures, for the product. Of course, in that case Magnatec DSD would have had to pay for that expense.

In the earlier example we underwrote the expense of building those fixtures, ourselves.

Q While you were at DSD, did you ever form an MCR, metal C-ring, using a forming technique other than roll forming or machining from an MOR?

A Yes, I did.

Q When did you do that?

A In the early months of 1970 I made a die-formed C-ring.

MR. SULLIVAN: Could we mark that for identification -- or as a full exhibit -- AC.

Q When did you say you did this?

A Early months of 1970.

Q Can you tell me why in the early months of 1970 you decided to die-form a C?

A Well, in my capacity as chief engineer, part of my duties were to come up with different ways of producing the seals that we were involved in.

Early in my employment at Magnatec DSD we had some inquiries from the users of C-rings.

Q Do you recall who they were?

A Yes; Brookhaven Labs, for instance. I think the name Schukman was mentioned earlier. He contacted Emerson, and Emerson in turn contacted me and asked me if I'd make some C-rings.

The early experiments in producing C-rings were in the conventional manner that Advanced Products uses. We cut C-rings from O-rings. It was really a low priority program, but we did make a few C-seals and delivered them to Brookhaven Labs for evaluation, along with a few other users, as I recollect.

The evaluation of those C-rings was not successful; and, in view of the fabricating techniques to make an O-ring that were the state of the art at that time, it's understandable why Brookhaven wasn't satisfied with them. The normal difficulties with machining the neck down that's been described by the plaintiff was in existence on all O-rings at that time. So our attempts to get in that market were not successful.

However, over the remaining two and a half years that I was at Magnatec I did a little thinking about this problem, of making a C-ring from a formed hoop; and, since we had developed the machine, we had built this machine to make a band with TIG welding, I now had a TIG-welded band in my possession, a capability to make such a band or, I recognized, even cut that from a large-diameter thin-walled hoop. But I elected to use the welded band, since we had that capacity in house.

I took a band about an inch and three-quarters' diameter and produced this die that I've depicted here. It was a lower die with a center dowel pin, with a half a C in the lower segment. And I first wanted to study the forming problems of such a trial.

So I took an upper holding plug, which was nothing more than a turned cylindrical part with a short step in there so that this band would fit up onto this holding plug, and when I put it in a conventional arbor press, pressed down on the holding plug, the seal formed into the shape that I have outlined here. So I could quite easily see that it was conceivable to form by stretching in a female half-C die.

The next obvious step was to take and duplicate this lower die as in the upper die configuration, which I did, and at the same time I cut back this surface. I don't think I really did it intentionally, but that's the way the design -- the tool shop mechanic cut this part for me.

This part was down to about half that C height, and when we brought the upper and lower C die together, we could actually look in here with a flashlight and witness the forming operation as the C was converted from a full band into a complete C-shape as I've outlined here. It's essentially -- it's precisely the die that I described in my memorandum to Harvey Sommer, a final die, matched metal die.

Now, that's what I called it, because it's made of metal, because the upper and lower halves are matched in all respects; two shapes are identical. And I used the generic term of "matched metal die" to describe this die set. Half a C was in the upper half and the other half of the C was in the lower half. It utilized a center dowel pin, and it, in fact, did have -- just, I will admit, by accident -- a stop. But this is the configuration we had.

And we produced three or four seals from that die early in -- well, I'd say late April -- late April, 1970.

Q Just so that it is clear, why did you say by accident it happened to have a stop there?

A Because I really didn't sit down and draw this die with a sketch or a design. I discussed it with the toolmaker; he cut the parts. I went somewhere else handling other projects. He knew what I wanted. He explained the concept, and he cut this with a stop. I claim no inventive ability in there. It was just something the toolmaker did for me.

Q Was that obvious?

A It was obvious.

Q Can you tell me who was involved with that effort at DSD, if you recall?

A Yes. Mr. Earl Latimer was the shop superintendent or production manager. He actually had a flexible title. Earl Latimer assigned this project to the toolmaker to cut the particular parts.

I'm not positive who made each particular component. I think one man, I'm quite sure, cut these; a different man I believe cut the earlier plug.

Q Can you tell me, first of all, whether or not this concept of forming metal is referred to in the literature as curling?

A Yes, it is.

Q Is that a concept that is set forth in the literature?

A Yes, it is.

Q Let me show you two Xerox copies of pieces of literature.

MR. SULLIVAN: The first one we will mark as AD for identification; the next one we will mark as AE.

Q I ask you to describe those pieces of literature for me.

A AC --

THE COURT: Was that denied by the plaintiff, this literature on curling?

MR. KELLY: I did not hear your question, your Honor.

THE COURT: What is your claim with respect to the curling concept?

MR. KELLY: I think essentially that the general concept of curling is known and used, but curling to form a C-seal was something that was used in the early stage of the process, and, as such, that is proprietary knowledge.

THE COURT: And your claim is what? About 1960, was it?

MR. KELLY: Around then, your Honor.

THE COURT: All right.

A (Continuing) Exhibit AC is a photographic reproduction of pages in a textbook that I've had in my possession since probably 1950. It's published by the International Textbook Company, Scranton, Pennsylvania, and it is dated 1943.

Q Do you recall how you happened to get this textbook?

A I've had that book for years, and I don't really remember the first day I got it, but I'm sure it was handed to me by some toolmaker that I had association with over the years.

Q Can you describe this exhibit, AD?

A Yes, I can.

Exhibit AD --

THE COURT: What was the other exhibit? Was that marked?

MR. SULLIVAN: I am sorry. That was AC, your Honor, for identification.

THE COURT: That is AC?

MR. SULLIVAN: I am sorry, I mixed it up. The first one was AE -- we took them out of order -- that he just described; and the next one he is about to describe is AD.

A (Continuing) AD is an excerpt from a book entitled "Tool Engineering, Punches, Dies and Gauges," McGraw-Hill, 1925, and on page 85 we have a concept of curling fully described in the literature which is almost identical, similar -- in fact, exactly similar in concept to the literature on AE.

Q Before we get into that, let me show these to Mr. Kelly and see if he has any objection.

A Excuse me. What page is that in this book?

Q 53 and 59. I will describe them.

MR. KELLY: Your Honor, we won't object if the entire publications are offered as exhibits. I think they are incomplete.

MR. SULLIVAN: It is just that it is his own book. I suppose we can mark it.

BY MR. SULLIVAN:

Q Do you have any objection?

A No, I don't object.

Q With respect to this one?

A No.

Can I explain this?

Q That is at Yale?

A Yes.

MR. SULLIVAN: With respect to AD, your Honor, it is a book that is difficult to get out of the engineering library at Yale. I can tell them where it is. It is at the Yale engineering library.

THE COURT: Can you identify the book that it came from?

MR. SULLIVAN: Yes, your Honor.

THE COURT: All right, objection is overruled. Exhibit AD may come in without the full publication, which is at Yale University. The book has been identified, and the plaintiff may wish to introduce all of the book, themselves, but I am satisfied that AD may come in as a separate exhibit without the entire volume being brought in from Yale.

MR. SULLIVAN: Thank you, your Honor.

THE COURT: How about AE? Do we have that book here?

MR. SULLIVAN: Yes, it is his book. He says he has no objection. I will make it available to them.

THE COURT: I think for the time being I will take AE as a sole exhibit, make the book available to the plaintiff, and if the plaintiff after examination wishes to introduce the book

I will hear arguments at that time.

MR. SULLIVAN: Thank you, your Honor.

I will describe again for the record:

AD is entitled "Tool Engineering, Punches, Dies and Gauges," by Albert A. Doud and Frank W. Curtis, First Edition, 1925. It is a McGraw-Hill publication.

AE is entitled "Aircraft Fabrication Forming By Hydraulic and Crank Presses." It has a copyright date of 1943.

AD is a two-page document and AE is a three-page document.

BY MR. SULLIVAN:

Q Let me show you what has been marked as AD and AE.

Would you explain to the Court how the curling concept is depicted in that literature?

A In Exhibit AD, on page 85, there is a drawing on the upper right-hand side that agrees with this shape here.

THE COURT: We'd better get that shape there identified. Exhibit?

MR. SULLIVAN: AF.

THE COURT: AF is similar to the drawing

in the upper right of exhibit -- what? AE?

THE WITNESS: AD.

THE COURT: Okay.

THE WITNESS: Do we have an exhibit number for this?

THE COURT: AF.

MR. SULLIVAN: Yes, mark that AF, please.

A (Continuing) This, as I point out, on page 85 of Doud and Curtis, is the upper right-hand view of the -- the upper half of the curling die.

Now, there is a section cut off of the long hoop being curled, which represents this cylinder here. Now, that cylinder is curled in an outboard direction, and there are three views showing, one the initial stage as I've indicated it, the second one a half curle, and the third bottom view a full curl.

Now, I maintain that the concept I used in this is nothing more than a curl, but a one-half curl. As we bring this nose down, the nosing die or the curl die down, on this band, we form the slug in an upward direction. This represents the center line of the slug and it also represents the same center line on this drawing. The center line of this curl die is in this position.

In my die concept that I came up with here, once again, the band is formed, in an outboard direction fully supported, on the inner surface of the band unsupported at all. There's no support on the outside.

This concept is described completely as shown in this textbook.

THE COURT: In the textbook what were they trying to make?

THE WITNESS: They were just trying to describe the basic fundamentals of curling. The product really isn't important, your Honor. It's a textbook used in tool engineering to explain concepts.

THE COURT: All right.

MR. KELLY: I believe that exhibit tells what they are making, your Honor.

MR. SULLIVAN: Your Honor, I would save this for cross-examination.

MR. KELLY: The Court asked a question.

THE COURT: Does it say what they were making?

THE WITNESS: Let me read from it, if I may, examples.

THE COURT: Do not read the whole thing. Were they making a product?

THE WITNESS: They were making a variety of products, butt hinges, water pails, funnel, automobile horns, cooking utensils. As I tried to say, it's the concept that's demonstrated.

THE COURT: Go ahead, Mr. Sullivan.

BY MR. SULLIVAN:

Q With reference to Exhibit AE would you explain to the Court what is depicted in there?

A AE is one more additional piece of literature. In this particular case it's describing the curling die in use of a -- the curling die in use in a crank press.

I merely refer you to this to show the fact that many textbooks explain the principles of curling, and they're the same and common throughout the metal forming industry.

Q With respect to AE, I believe you indicated that you had an opening here so you could look in and see how the part was forming?

A That's correct.

Q With respect to this opening here, is that functional? Does it make any difference?

A It makes no difference whatsoever. It's a non-functional feature of the die.

Q Now --

THE COURT: I do not think it matters much, but would you read back the number of that exhibit?

(The question referred to was read by the reporter as above recorded.)

(Discussion off the record)

THE COURT: Change that to AC, Mr. Russell.

MR. SULLIVAN: Sorry, your Honor.

THE COURT: I do not think it makes any difference, but keep the record straight.

MR. KELLY: No objection, your Honor.

BY MR. SULLIVAN:

Q Can you explain to the Court, Mr. Sniegowski, if there was a reason why you started forming an external C as opposed to an internal C?

A Yes, there was a reason.

MR. SULLIVAN: At the outset, so I do not forget it, would you mark it AG.

A (Continuing) In my memorandum to Harvey I touched -- to Mr. Sommer -- I touched on some of the concepts that must be considered when you study the problems of metal forming, if you take a band and you want to distort it into a C-like shape, as I described earlier. If we use a curling die, you are actually -- a curling die with the shape cut on the outboard side of the band, you actually are forming that band; you are converting it from a straight section into a curved section, as I've depicted in this drawing, by stretch-forming or expansion of the metal. The inner surface of this cylinder is fully restrained, or supported, if you want to use that word, by the die cavity shape. Now, since it is fully supported, as you bring this hoop down there is practically no -- there is no tendency for buckling on the inner surface, because the outer surface of the band is supported by the die.

Stretch forming, or expanding of the metal, to create the external pressure ring, is the simplest form, and that's why I tackled it first. Conversely, if I took that same diameter band and tried to curl in an inboard direction to create an internal pressure seal, the inner surface of that band would be unsupported, and in forming an internal pressure ring in a die of this nature the mechanics of the metal flow involve shrinking or contraction of the metal, and, since there is no internal support, as the defendants have -- as the plaintiffs have pointed out, there is a tendency for wrinkling or distortion.

I chose to make my first part in this manner just to get the first one made successful.

Q Did there occur to you a method which would permit you to form an internal pressure seal utilizing stretch or expansion techniques?

A Yes, there was.

Q Could you explain that to the Court?

A I've put on the lower third of this diagram AG an example of how I knew we could form a C-ring from a straight hoop and yet utilize the concept of stretch forming or expansion of metal by using a rubber press forming method.

Here again I'd have a male die with a C in it cut longitudinally so that we could separate the die from the product after forming, and by utilizing a ram bring down the rubber plug and expand that band into the C-shape that I've shown here.

The first case is forming -- the second case is forming an internal pressure die, pressure ring, from shrinking, and the latter case is forming an internal pressure ring by stretching. I was cognizant of this technique, and, in fact, I used this very technique on rubber press forming of Servo-Flex seals. I had no doubts in my mind that the next step I would use after this would be rubber plug -- rubber press forming, and that's one of the reasons I introduced it into my memorandum to Mr. Sommer concerning that approach.

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Q So there is no confusion, when you were at DSD you made a die that we previously marked as AC?

A That's correct.

Q That was an external seal.

You did not make this and you did not make this?

A That's correct.

Q But you had made a rubber press die for a Servo-Flex?

A Absolutely right. I made only one die, and that was the external pressure ring that I described.

I would like to elaborate on that, if I could.

Q Okay. Go right ahead.

A By the same token, I could easily, using all the principles that I described on the rubber press forming of Servo-Flex seal --

Q Before we get into that -- I am sorry --

MR. SULLIVAN: Why don't we mark that AH.

A The literature --

MR. KELLY: Your Honor, I am going to object again, and I think we are getting away from the realm of showing what is common knowledge. He has told us what he knew. Now he is telling us what he would have done if he had had the opportunity.

THE COURT: That will go to weight. I do not think it will go to admissibility. I am sure that you are going to point a lot of these things out on cross-examination.

But could I go back one step?

The external pressure C-ring that you made--was that AC?

THE WITNESS: AC.

THE COURT: Right -- pursuant to an order?

THE WITNESS: No, it was not.

THE COURT: But you actually made them?

THE WITNESS: Yes, I did.

THE COURT: Did you keep a copy of that die?

THE WITNESS: No, I did not.

THE COURT: I should not have said that.

Did you keep the die that you made?

THE WITNESS: No. I completed this work in the latter part of April of '70, and I left the company in May of '70.

THE COURT: If I recall, with this external pressure die or external pressure seal that you were making, you were experimenting at that time. There was no order pending; is that correct?

THE WITNESS: That's correct, right.

THE COURT: On the internal pressure C-ring, you did not even experiment with that?

THE WITNESS: That's correct.

THE COURT: Okay. And now we are going to AH?

MR. SULLIVAN: Yes, your Honor.

THE COURT: To demonstrate?

MR. SULLIVAN: If your Honor needs any information as to why I am doing it like this, it is only for clarity's sake. It is a little out of the sequence.

A (Continuing) I'm explaining here that the concepts of forming by utilizing rubber and stretch forming a band into a C are public knowledge. As I tried to explain why the use of the K-Prene chart, rubber -- rubber press forming, as this is commonly known, is quite common, the principle that was demonstrated here was in fact used on the Servo-Flex seals that I described earlier that we actually produced, and I think it's important to explain that the only difference is that there is a shape difference. Whether it's a V-seal or a C-seal or a Servo-Flex seal, the only difference in the forming technique is the shape.

And, again, this is one of the reasons that I had that approach defined in my memo to Mr. Sommer when I was requesting that he get started in the C-ring business.

Here it shows a band which is formed by stretching into a C-shape. The removal of the die would be routine, by putting a split in it, and the split die could be retained by a variety of standard techniques.

In the second application we're taking a band and forming it into an external pressure seal by shrinking. Once again the rubber is compressed by the ram; the die is cut so that the shape of the rubber will force the band into the shape. The same concepts were used in Servo-Flex fabrication at Magantec DSD.

In addition to that --

THE COURT: Could I ask you a question?

THE WITNESS: Yes.

THE COURT: On AH, subsection A --

THE WITNESS: Yes?

THE COURT: -- what principle avoids wrinkling?

THE WITNESS: The fact that the rubber plug supports all the surfaces of the tube inside.

THE COURT: All right.

THE WITNESS: And it is pressed into the die cavity.

THE COURT: And I assume it does not adhere to it?

THE WITNESS: That's correct.

THE COURT: To distort it after it is shaped?

THE WITNESS: It completely separates from the product.

THE COURT: When the pressure is released, the rubber will just --

THE WITNESS: It will bounce back.

THE COURT: Without distorting the --

THE WITNESS: Yes. And if you study this K-Prene manual, that describes the process completely.

THE COURT: All right.

A (Continuing) In the second case, again we're forming an external pressure seal by rubber press forming techniques, and actually the material is engaged in shrinking it. It flows into the inner direction of the tube center line.

The latter case is an example of forming an external pressure, the same seal as this, by using a rubber plug on the inside of the band and expanding the band, expanding the metal in the band, until it takes a shape around this C projection in the die. And if there's any misconception about return, we can cut the return in that male section of that die, and that band will form with an exact return similar to a roll-formed C or a C fabricated from a metal -- matched metal die.

Q Mr. Sniegowski, just so there is no misunderstanding, when you are shrinking to form an external pressure seal here -- and, indeed, for all the rubber press forming -- it is always supported on the ID of the seal?

A Yes.

Q So you do not --

A It is on the I -- the ID of the tube is supported --

Q Yes.

A -- and in that case an internal pressure seal -- the band is converted to a C fully supported by the rubber plug.

Now, on this external pressure the band is supported on the outer surface completely, and the band is converted to match the die shape. And, of course, in the latter case, to form the external pressure seal, the rubber supports the tube along the ID of the tube and presses this band into the C matching the die shape as depicted.

Q Is it fair to say that wrinkling is a problem when you are shrinking and not a problem when you are stretching metal?

A That is correct. But in this case we're shrinking. It's not a problem because it's fully supported by the rubber plug.

Q That is an external seal there?

A That is an external pressure seal.

THE COURT: What is your opinion as to the quality of the C that would come from that?

THE WITNESS: The quality of the C?

THE COURT: Maybe I am not expressing it right.

Would you say ten out of ten would be of good quality, five out of ten, one out of ten?

MR. SULLIVAN: Scrap rate?

THE COURT: What is the correct expression?

MR. SULLIVAN: Scrap rate, your Honor.

THE COURT: Yes. What is the scrap rate?

THE WITNESS: The scrap rate would be nil. I would say once the die is made through an early stage of trial and error, once the die is made, you would have 100 percent repeatability. And this I assure you was the case in the Servo-Flex forming and it would be the case in the C-forming.

THE COURT: That is in the V?

THE WITNESS: The V or the C or the Servo-Flex shape.

THE COURT: All right.

MR. SULLIVAN: Thank you, your Honor.

BY MR. SULLIVAN:

Q Is there anything else you wish to say with respect to those exhibits? I looked through my notes but --

A No, that's all I have to say.

Q During your years at DSD, what materials were you working with for sales, say? What metals?

A The common variety of metal seals that are used in the exotic seal industry, if we can use that term. Classic metal O-ring materials would be Inconels and stainless steels, Inconels such as 718, Inconel X-750, Inconel 600, and stainless steel sheet or tubing such as 304 stainless, 316 stainless. All of the materials were used at Magnatec DSD for Servo-Flex forming, for V-seal forming or for C-ring forming, were common in both cases, the same family of metals for the product. In one case it would be a tubular form and in another case it would be sheet or strip forming.

Q So you used strip at DSD?

A We used strip and sheet.

Q What kind of tooling were you involved in at DSD?

A Conventional tooling materials, air hardening tool steels, oil hardening tool steels, aluminum for temporary tools that we required light weight; we even used materials such as copper or brass, just standard variety of materials that would be used in any metal fabricating shop.

Q While you were at DSD, you have already testified that you designed a horizontal TIG welder which was permitted the acceptance of strip and the automatic TIG welding of strip thereafter; you recall that?

A Yes.

Q While you were at DSD, did you design any other automatic TIG welder?

A Yes, I did.

Q Will you tell us a little bit about that?

A When I first joined Magnatec DSD, the president explained to me that he wanted very badly to get into the field of nuclear pressure vessel rings. He was aware that Advanced Products Company was the leader and practically had 90 percent of the market in that field, and Magnatec would like to get some of that business. He did not have a capability to rotary or orbital TIG weld the tubing for public literature is where you would have a female cavity cut in the metal die and you would position the blank here and you would bring down a rubber-actuated disc by a top flat plate and push the rubber into this -- of course, you would have to have the rubber restrained on the outside and on the inside, but you could push this rubber plug down by a ram pressure and force that blank into this female cavity by rubber press forming methods.

This was common knowledge, and the practice of forming metal was, in my mind and in textbooks and literature, available.

MR. SULLIVAN: Could you mark that AQ, please?

THE WITNESS: There were other areas where rubber press was considered.

BY MR. SULLIVAN:

Q I believe you previously indicated you considered rubber press for two reasons, one, possibly to pre-form, and, two, at some point, under some circumstances, to actually make final C's; is that correct?

A That is correct.

Q At some point in May 1973 did you write a memorandum to Mr. Sommer, which has been marked twice in this lawsuit -- but I will take the one that has been marked Exhibit R? At some point in May did you prepare and offer that memorandum to Mr. Sommer?

A Yes, I did.

Q Can you tell me why you authored that memorandum to Mr. Sommer? What was your purpose in writing?

A As I mentioned, the early months of '73 and the latter months of '72, the C-seal activity within our company was increasing. More and more the inquiries were coming in. I had inputs from our sales department, our sales engineers, our sales manager and our vice-president in charge of sales. It was clear that the activity in C-seal sales was on the increase. We had all these discussions, offhanded discussions, on the floor, in conferences with salespeople, machinists, and we had several formal meetings, as I've already indicated.

In view of all this activity and all the discussions and meetings, I thought it would help if I formalized the variety of methods and techniques that we had discussed in relation to starting a metal forming activity within our company. I wasn't satisfied with the speed with which this action was progressing. We had many conferences and discussions, but I felt there was very little action going on, and I knew the general opinion of the shop people that were making C-rings by cutting them from O-rings. They recognized this was not an efficient way to go. We all recognized it wasn't an efficient way to go, and so I wrote this memorandum to collect all the topics and methods that had been discussed, ideas that were my personal opinion and ideas that were the opinion of other people in the company. I felt if a formal memo was written with specifically stating all the techniques involved, I would be able to push forward and get some action to make parts by die-forming or roll-forming or forming in any of the methods that are in this memo.

Q Had Mr. Sommer asked you to prepare and submit that memorandum?

A No, he did not.

Q Just taking you again back to the time period that we have spoken about, February through May of 1973, you have discussed at length a number of different methods here. Let me just ask you whether or not you considered that any of these methods of obtaining the hoop on AJ or the methods of forming the C on AL were what you describe as the preferred method. Or did you have your favorites?

A No. In my opinion they were all very important, and I couldn't really assign a priority to any particular phase. I envisioned right from the beginning that all these methods would be utilized at one stage or another in the production of formed metal C-seals at Advanced Products.

Q With respect to the methods of producing the hoop on AJ, are any of those methods depicted more versatile -- is one more versatile than the other?

A Well, certainly welded bands. If you were going to consider versatility, the welded bands from finished width strip has the most versatility, in that you can create a greater variety of seal diameters with that technique. If you have a welding capability and you can buy the bands, you can quickly make hoops, any given order, from the welded bands.

Q With respect to the forming methods that are on AL, did you have any preferences?

A No, I didn't have any preferences. The techniques that are described there, I would say roll forming and die forming are the most common that one would look to initially. The rubber press technique was my own personal ideas, and it had applications, but it wasn't a consideration that I considered of major importance. And the last item, compression between flats, I again envisioned some limited application for three and four and major utilization of roll forming and die forming.

Q With regard to the various forming methods, again, of those methods that are listed up there, are any of the methods more versatile in the sense that they have wider application or wider potential application than any other method?

A No, I wouldn't say that there is any wider application. Roll forming or die forming are, in my opinion, closely related on importance to the forming of C-rings with a forming approach.

Q With regard to the memorandum that you wrote to Mr. Sommer --

MR. SULLIVAN: I am getting into another area, your Honor. I do not know whether you want to --

THE COURT: Are you getting into another time period?

MR. SULLIVAN: It is the same time period. I am just going to go into the exhibit now. I could continue.

THE COURT: We could recess for lunch, because I do have something at five or ten of two, and you may want to go out and get some lunch. Why don't we recess now. We will recess until two-fifteen.

(Luncheon recess)

oOo

AFTERNOON SESSION

THE COURT: Read to proceed?

MR. SULLIVAN: Yes, your Honor.

THE COURT: Very well.

BERNARD J. SNIEGOWSKI, defendants' witness, resumed and testified further as follows:

DIRECT EXAMINATION

BY MR. SULLIVAN:

Q At the end of this morning, Mr. Sniegowski, I had referred you to what has been marked as Exhibit R, which you have testified as a memorandum you prepared for submission to Mr. Sommer near the end of May 1973.

With respect to that memorandum, I reference you to Exhibit AJ. AJ is on the top. Would you tell the Court whether -- AL you want to start with?

A Yes.

Q Starting with AL, would you tell the Court whether you covered each one of those metal forming methods in your memorandum to Mr. Sommer?

A Yes, I did.

Q Can you tell me specifically, starting with roll forming, what paragraphs in Exhibit R discuss the concept of roll forming?

A Roll forming is described in Exhibit R in paragraphs four, five, six, fourteen, seventeen-B and seventeen-D.

Q With respect to the concept or the technique of utilizing die forming, in particular matched metal die, can you tell me what paragraphs of Exhibit R discuss that forming technique?

A The forming technique of die -- die forming with matched metal die is described in paragraphs ten, eleven-dash-four, fifteen, seventeen-B and seventeen-C.

MR. KELLY: Excuse me, Shaun. I believe the witness is referring to some notes in his testimony, and I think, if he is going to do that, then the notes should be marked.

MR. SULLIVAN: I have no objection, your Honor.

THE COURT: All right, the notes may be marked.

MR. SULLIVAN: You have already seen these; haven't you?

MR. KELLY: Yes.

MR. SULLIVAN: Exhibit AR are two pages, two typewritten pages, which the witness is referring to.

THE CLERK: Full exhibit?

MR. SULLIVAN: Yes.

THE COURT: Pardon me?

MR. SULLIVAN: He wanted to know if it is a full exhibit. I will mark it any way the Court wishes.

THE COURT: Yes, you might as well.

BY MR. SULLIVAN:

Q Let me return these to you.

With respect to the utilization of a matched metal die, the paragraphs that you have cited, they discuss both the utilization of a matched metal die to form an ID -- that is, an interior or internal pressure seal -- and an external pressure seal?

A That's correct.

Q Can you relate to me what paragraphs in Exhibit R set forth the forming technique we have listed as number three, rubber press forming?

A Rubber press forming is discussed in paragraphs nine, eleven-dash-one, fourteen and seventeen-B.

Q With regard to the last technique, what paragraphs is that discussed in, compression between --

A Compression between flats is discussed in paragraph eleven-two and eleven-three.

Q With regard to the methods of obtaining the hoop which are set forth on Exhibit AJ, would you tell me where in Exhibit R the technique of forming hoops from tubes is set forth?

A The technique of producing hoops from tubes is reviewed in paragraphs two, seven, sixteen, seventeen and seventeen-E.

Q With regard to the method of producing hoops from welded bands or tubes, where is that set forth?

A Production of hoops from welded bands or welded tubes is described in paragraphs seven, eight and sixteen.

Q With regard to Exhibit R, which I believe you have in front of you, would you with reference to each paragraph in that memorandum explain to the Court the purpose for the inclusion of that paragraph in that memorandum?

MR. KELLY: Your Honor, I am going to object. I do not see the relevancy of going over the memo in detail. Apparently it was not used by the Advanced Products Company, by David Kramer in his duties.

MR. SULLIVAN: Your Honor, that is not an accurate statement in the sense that the memorandum reflects conversations that Mr.

Sniegowski, Mr. Sommer and Mr. Bell had prior to the hiring of David Kramer. It is relevant in and of itself for that reason.

Secondly, the evidence will show that Mr. Sniegowski and Mr. Sommer did speak to Mr. Kramer about how Advanced Products would precision metal form.

I think it is relevant for those two reasons.

THE COURT: All right. Objection is overruled. Of course, the exhibit speaks for itself.

MR. SULLIVAN: Yes, your Honor. The only reason I am going over it in this fashion -- and if the Court wishes me not to do so I will not -- is that it is a technical memorandum, and I thought it would be of aid to the Court to have this testimony.

THE COURT: All right.

MR. SULLIVAN: I realize the document speaks for itself.

THE COURT: All right. Let's see what he has to say about it.

BY MR. SULLIVAN:

Q With respect to Exhibit R, would you explain to the Court the purpose for the inclusion in that memorandum of each paragraph? I believe there are seventeen paragraphs, and if you could start with number one I would appreciate it. Go right down the list.

A What I'd like to say is a very brief, few-word comment on each paragraph.

Paragraph one indicates that we recognized the fact that we can form C-seals from hoops at low cost, discusses the selection of equipment and the economics involved in this production plan.

Item two indicates that we did have on hand a one-inch tube, 020 wall of Inconel X-750, that we considered several techniques for forming C-seals --

Q Where did you get that one-inch tube and when and who got it?

A That tube was purchased specifically to do some preliminary work for forming of C-seals, and I am not positive of the date that this was obtained, but I would say at least six months prior to the release of that memo I discussed this with our purchasing agent and he could not buy a piece of tube for that configuration, but he was able to get a free sample from one of the tube supply houses.

We had it in shop, and it was obtained specifically for a couple of trials with the methods of matched metal die forming.

Paragraph three, very briefly, is a discussion of the dimensional relationships of a C in respect to an O of different cross-sectional diameters, with emphasis on pointing out approximate hoop heights for each of those O-ring diameters in relation to comparable C-seals of those same general diameters.

Paragraph four discusses roll forming of preforms, male and female rollers for each height.

Paragraph five describes the need for a rolling rig and also describes the fact that we have something available.

Paragraph six describes a rolling rig with the fact that we should be concerned with the guidance in utilizing any rolling rigs.

Paragraph seven describes the production of hoops cutting from tubes, making of strip for large-diameter seals, utilizing strip for large-diameter seals, and the procurement of strip.

Paragraph eight describes welding, TIG welding, plasma welding, the recognition of end crater problems, and the fact that we might have to buy or make special equipment.

Paragraph nine describes six inches and under for rubber press forming and also under certain conditions using some aspects of rubber press forming up to twelve to eighteen inches in diameter.

Paragraph ten clearly describes the use of matched metal dies for sizes under an inch.

Paragraph eleven --

Q Let me just stop you there, sizes under an inch. Do you know why you suggested under an inch in particular?

A Only because we had the one-inch-diameter tube available and I was emphasizing that as a point to get started immediately.

Paragraph eleven defines -- it's a discussion on the amount of the return under certain conditions as related to pre-forming shape. It also takes the pre-form band into a C by the methods of paragraph eleven-one, two, three and four. No priority was intended there, just a description of the variations worth considering.

THE COURT: What did you have in mind when you said "See my layouts"?

THE WITNESS: I had in mind the fact that I would create some very precise layouts for the meetings that I expected to have on Monday.

Initially it was Friday, and then I slid it to Monday.

THE COURT: Were those layouts ever completed?

THE WITNESS: They were never made.

THE COURT: What did you have in your mind to put on these layouts?

THE WITNESS: What I was going to put on these layouts is all the concepts that I have shown here today in my sketches -- not only today but in the other meetings. I was going to describe with official layouts drawn with dimensions the concepts involved for each of these die form systems.

THE COURT: Could you refer me to a particular exhibit?

THE WITNESS: There's one I would have included in the layout.

THE COURT: What number is that?

MR. SULLIVAN: What number is that?

THE WITNESS: I'm sorry, your Honor, that one didn't get marked as an exhibit.

MR. SULLIVAN: We have not had any testimony on that yet, your Honor.

THE WITNESS: The die system that I was referring to could have been this configuration, the dies that I've been discussing all along.

MR. SULLIVAN: AO.

THE WITNESS: Rubber press forming methods.

THE COURT: Wait a minute. First of all, let me see if I read it right. In four you are talking about a metal die set split, one-half C top and bottom; right?

THE WITNESS: Yes.

THE COURT: When you say "See my layouts," are you referring to number four or are you referring to other items in your memo?

THE WITNESS: That last sentence, which says "See my layouts number blank and number blank for further details" is not specifically related to any one of the four above. I had hoped to use whatever time I had available to make as many layouts as I could before the Monday meeting. It would include the straight matched metal die set described in four.

THE COURT: It would have included AO, in your opinion? AO and what else?

THE WITNESS: All right. I'd have to

refer to the other exhibits, your Honor.

THE COURT: All right, I wish you would.

MR. SULLIVAN: Can you get me Exhibit AC?

THE COURT: You would have included AC?

THE WITNESS: Yes, your Honor, I would have.

THE COURT: I just want the exhibit numbers. Anything else?

THE WITNESS: I would have included, although it wasn't specifically called out there, the axial dies.

THE COURT: What number is that?

THE WITNESS: The right-hand side of Exhibit AO.

MR. SULLIVAN: Can I have Exhibit UU?

THE WITNESS: It would have included some layouts of this configuration, and perhaps a little more detail beyond what is shown on these layouts.

THE COURT: That would be AH?

THE WITNESS: AH.

THE COURT: All right. Anything else?

THE WITNESS: I don't believe I have any sketches prepared for paragraph two and -- eleven-two and eleven-three, but it certainly would have included some layout work showing that concept as well, using the pre-form that I include in my memo under paragraph eleven and the converting of that pre-form shape into a C-like shape as described in paragraph eleven-two and eleven-three.

THE COURT: All right. Now we are going -- what, paragraph twelve?

THE WITNESS: Yes, your Honor.

A (Continuing) Paragraph twelve is a brief description of the segments of the C-shape as depicted in paragraph eleven. If you will look in paragraph eleven, I show three letters encircled, A, B and C, in paragraph eleven. A represents the total free height of the band, B represents the circumferential length of the area that's been classified as the return, and C is the half of the C-shape. In paragraph twelve I describe those and, in fact, mention the significance dimensionally of those zones.

Q When you talk about C, half of the C-shape, where was the half of the C measured from?

A You can see in the picture under eleven it's that zone to the left of the vertical center line. It's exactly half the circumference of a circle of the given diameter that I referenced.

Paragraph thirteen is a discussion, as the lead-in words state, "Metal flow behavior for various configurations," internal C --

THE COURT: What do "OD" and "ID" stand for?

THE WITNESS: In this paragraph thirteen ID represents an internal pressure C. You notice the sketch on the right shows the center line and the hoop and the transformation of the metal from a vertical band into a C-shape. And paragraph thirteen-B is the converse of that, where we would form that same band into an external pressure seal. Paragraph C shows an internal pressure C being formed by stretching, as I discussed earlier this morning. Paragraph D describes the concept of creating an external pressure seal from a band by stretch forming.

A (Continuing) Paragraph fourteen mentions rubber press forming of a pre-form to explore paragraphs eleven-two, eleven-three and eleven-four specifically on internal pressure rings.

Paragraph fifteen describes an option to form external C's with matched metal dies, and, in fact, suggests a preference -- possibly preference to fourteen -- to paragraph fourteen.

Paragraph sixteen describes the use of tubing for small sizes, mentions the fact of the availability of tubing may be a consideration. It also describes the fact that we must weld tubes or bands for size variations, and also mentions the fact that we should produce wider bands and we may consider that technique to cut multistrips from wide bands.

Paragraph seventeen tries to make a very brief conclusion and summary and institute a plan of action. You notice in the first sentence it says "Assuming we have agreed to go with the one-inch tube on hand," I would like to have Mr. Sommer give me approval to make an external or internal pressure seals and also indicate his preference on what free height -- that is, an 062, 094 or one-eighth diameter -- because we had discussed this.

Paragraph B elaborates that we should make a decision on roll forming of the first-stage lip or rubber press forming of.the first-stage lip and the use of matched metal dies or both.

Paragraph seventeen-C emphasizes that if we made a decision on paragraphs seventeen-A and B we could then go on quite easily and review the considerations -- and resolve the considerations of paragraph eleven-two, eleven-three and eleven-four.

Paragraph seventeen-D describes the fact that we must expand our roll forming program and agree on priority in view of my limited time and the limited manpower available. It was obvious in our discussions that we would have to phase some of this work into immediate or secondary work priorities, and I was there trying to get a decision on the phase of effort for roll forming.

Paragraph E specifically relates to the one-inch tube I had on hand, and Mr. Sommer had indicated that he would like to do some work with ten-thousandths or fifteen-thousandths wall thicknesses rather than the twenty that I had, and, in fact, we knew we cut this wall thickness down and I was trying to get a decision on that.

Paragraph F indicates that I would target to have the layouts and sketches ready for a Monday morning meeting.

THE COURT: And that was how many days later?

THE WITNESS: That would have been, counting the weekend, Friday, Saturday, Sunday, Monday, four days including Friday, Saturday and Sunday.

BY MR. SULLIVAN:

Q In your recitation, the Judge asked you what do "OD" and "ID" mean.

OD is an external seal; is that correct?

A ID -- in paragraph thirteen-A I refer to ID as a C that is opened towards the ID, towards the center line, the vertical center line of the cylinder.

Q So it is inner diameter; is that --

MR. KELLY: Your Honor, I think that is a little bit leading.

THE COURT: Pardon me?

MR. KELLY: I object, your Honor. He asked the witness twice if he knows what it means, and how he is attempting to lead the witness. If he knows what ID and OD mean, he should state it.

MR. SULLIVAN: Your Honor, it is such a minor point; I am trying to clear up your question.

Q Do you know what "ID" stands for?

A Yes.

Q What does "ID" stand for?

A "ID" specifically relates to inside diameter.

Q How about "OD"?

A Outside diameter.

Q You mention free height, and in seventeen-A you said you wanted Mr. Sommer to indicate what free height you meant. What do you mean by "free height" if we are talking about a formed C?

A The total height from top to bottom of the C-shape.

Q Let me show you an exhibit which has been marked Plaintiff's 6.

With reference to the ring that I am giving you, can you explain to the Judge what you mean by the term "free height"?

A "Free height" is a term that is applied to a finished C-ring as that dimension that would be taken from a seal if it was placed on a table and you measured the vertical height from the top of the seal to the table. In the case of a formed C, that is the height -- the free height of the C-shape. In the case of a band, it might also comparably be construed to mean the height of the band when you place it on a table, from the top of the band -- the dimension from the top of the band to the bottom of the band when it is resting on a table.

Q With any of the conversations that you had with Mr. Sommer and Mr. Dell and Mr. Hostage from February through

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May of 1973, did they deal at all with how Advanced Products would finish the formed C-shape once it got it?

A For all intents and purposes those conversations were not related to the aspects of completing a C-ring.

Q Why?

A Because the methods are identical to those that we used in the production of O-rings.

Q Are they also identical to the method you finish the MCR's you had machined from O-rings?

A That's correct, that's correct. If we use an O-ring and convert it to a C-ring by machining out a segment of the O-ring circumference, the process to complete that C-ring as a finished product to be delivered to a customer would be identical, and it was, in fact, a duplication of the techniques we used on metal O-rings. By that I mean electroplating, polishing, cleaning, packaging and fabrication techniques of that general nature common to both seals.

Q When you wrote this memorandum to Mr. Sommer and in your discussions with him as they approached May of 1973, you had discussed with him, I believe you previously testified, roll forming, die forming with a matched metal die, rubber press and compression between flats.

How long did you think at that time it would take Advanced Products to reduce to practice each one of these techniques?

A Perhaps a period of ninety days.

Q Okay.

Q Less than ninety days, actually.

Q What do you base that on?

A Well, my general experience in seal fabrication, particularly with the work that I'd done at Magnatec DSD, and forming of metal seals from bands, my experience and knowledge of TIG welding of bands for formed metal seals there, my experience with welding and forming of V-seals, and my general experience that I've had in seal technology.

Q How about your experience with roll forming a C?

A Same area there. My practice at Magnatec and other companies where I had roll-formed shapes certainly led me to believe that none of this was complicated. It was just a question of applying basic metal working practices and getting the program moving in a production shop.

Q I believe you have mentioned a couple of times that you wrote this memorandum to Mr. Sommer, he had not asked you for it, and you were concerned about getting the program moving.

What was the biggest problem, in your opinion, in terms of getting the program off the ground in May of

1973 at Advanced Products?

A Well, there's no question about it; the biggest problem was manpower, and I recognized that Mr. Sommer had a problem. When he reviewed this memo, I don't think he could have assigned the project to me because of the fact I was fully occupied on other work, projects such as electroplating of big rings and small rings -- by that I meant O-rings and C-rings in general -- electroplating of our other products. I was also heavily involved in welding operations within the company, not to mention my duties as the QC manager. I knew very well that it wasn't possible to assign that job to me, although somehow or other I thought I might be able to get some action and a decision to get someone on this job, whether it be me or Ken Bell or someone else within the company.

Q At the end of your memorandum to Mr. Sommer in R, there is attached to it a copy of a schematic.

What is that, if you know? Tell the Court.

A This is actually a very, very brief scale layout of some work that I had done in preparation for the layouts that I had referenced. It shows a band. It shows some pre-formed shapes in the band. It shows a finished half C. It shows the 90-degree segment that I had envisioned cut out from the O-ring to represent the material that I described in paragraph three of my memo. And this was in no way the formal layouts I had hoped to have ready by the following Monday.

Q So that isn't the layout you refer to in paragraph eleven-four?

A Absolutely not. This sketch was produced by me at the deposition just to show evidence that we had done some work in that line in relation -- I had done some work in relation to this memorandum.

Q Was that attached to the deposition, if you recall, when you produced it?

A I can't remember that. I think it was a loose piece of paper thrown onto the table during the deposition, and it was mutually agreed that it would be attached to the memorandum for general circulation between both parties.

Q The last paragraph in your memorandum refers to a Friday noon meeting, and that is crossed out and there is "Monday" on there.

Was that Monday meeting ever held?

A No, the Monday meeting was not held.

Q Why wasn't it held, if you know?

A Well, I assume -- well, it's not an assumption -- I knew Mr. Sommer was too busy to see me that Monday, and, for that matter, I was deeply involved in some other

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activities.

Q Is it customary for you to write a memorandum like this to Mr. Sommer to get you talking on an engineering matter that has been batted about?

A Yes, it is. I frequently write memorandums of this nature on any projects that I'm involved in. I try to collect -- my job is a project engineer. I try to collect whatever information I can in organized manner that I think may be helpful to Mr. Sommer to make decisions in his meetings with our vice-president, or, for that matter, meetings with our controller where it involves expense related to the purchase of equipment. It's not at all unusual for me to use this approach on any one of the problems that I face in my daily operations. If I have a problem in the plating shop I would elaborate a lengthy meeting on plating -- a memo on plating. Likewise on welding. And in general I write a good many memorandums of this nature.

Q Can you recall the first time that you learned that David Kramer was hired and coming to Advanced Products?

THE COURT: Do you mind going to the time period before that, when he first learned of David Kramer's visit and telephone call?

MR. SULLIVAN: Okay. It is the same

He was introduced to me as a man that was hired to take the position of project engineer and that he in fact was going to be directly involved with production of formed C-rings, with emphasis on forming of C-rings.

Q After Mr. Kramer came to the Advanced Products Company and after you learned what his job was, did there come a time when you sat down and spoke to Mr. Kramer about precision metal forming of metal C-rings?

A Yes, there was.

Q When was that and what was the occasion of that conversation, if you can recall?

A I can't remember the precise day, but I would -- I am quite sure that it was several weeks after his first day on the job. The reason for this, it was obvious to me he was familiarizing himself with all the activities in our plant; and I know it was several weeks, maybe even as long as a month, that we sat down to discuss his work or the work he anticipated performing in our organization.

Q Was there any occasion for that conversation, any reason why he came to you and discussed this with you?

A Well, I can recall the first day he did seek me out and asked if I would sit down with him and review some of the quality systems we had in effect. I went through our quality control manual, showed him our work traveler system that we have for all products going through the shop. He and I discussed in general the fact that C-ring activities with forming methods would require a special traveler, and we talked in general on the system steps for production sign-off and inspection sign-off of all the basic operations for C-ring production as he was going to introduce in the formed C.

Q Was he required to have this conversation with you because of your QC responsibilities?

A Absolutely. In fact, I believe he mentioned the fact that Harvey suggested that he sit down with me at some convenient time and we do this. It was logical that we should.

Q During that conversation you discussed general metal C-forming techniques; is that correct?

A Metal C-forming, more specifically metal C production, the entire process, because this traveler would obviously be related to every individual step in a general sense from start to finish, including heat treating, electroplating, forming, the procurement of the stock, the raw material, the identity of the material, codes for traceability to material certs, all the processes that I would be involved with as a QC manager and that Dave would certainly want to put his inputs on where we would inspect that seal, where we would eliminate inspection, where we just have production sign-offs. It was a general description of a process traveler.

Q During those conversations I believe you testified you became generally familiar with the steps to be undertaken; is that correct?

A That is absolutely right.

Q Did you in that conversation with Mr. Kramer -- if there was more than one you can tell me -- learn anything as to the techniques for precision metal forming that you and Mr. Sommer and Mr. Bell had not previously discussed?

A Absolutely not.

Q Did you discuss with Mr. Kramer in any detail, great detail, the particular ways of accomplishing each step in the production process?

A Not in detail, nothing more than just a casual remark that -- by Dave -- that he was going to use the die forming, for instance, or roll form; and his remarks very early in the conversation led me to believe that everything I had in that memo was essentially going to be complied with in the process that he was going to outline on metal forming.

Q So you understood he was going --

THE COURT: Including the rubber press form?

THE WITNESS: Yes. He mentioned die, a metal die form. I knew it was exactly the same die form that I had envisioned in my memorandum and Harvey and I had discussed in detail.

MR. SULLIVAN: Excuse me. I believe that his Honor did not say "press." I believe he said "rubber press."

Is that correct?

THE COURT: Rubber press.

THE WITNESS: Oh, you said "rubber press."

THE COURT: Yes.

THE WITNESS: I misunderstood your question, your Honor. I thought you meant press form as related to a die, a metal die.

No, he didn't even mention rubber press form to me.

THE COURT: Did you at that time say to him "Dave, I disagree with you, I've been in this business a lot longer than you and I am much more experienced than you, and I think you are using the wrong method"?

THE WITNESS: No, I did not, your Honor.

THE COURT: Did you ever go to Mr. Sommer and say "I just talked to Dave and I just really think that we ought to try some other method, other than his suggestion"? Did you ever do that?

THE WITNESS: No, I didn't, your Honor.

THE COURT: In the two weeks or more after you wrote the memo but before Mr. Kramer came on the job, did you ever have a meeting to take the place of that Monday meeting?

THE WITNESS: No, we didn't.

THE COURT: Is that because you were too busy in those two weeks?

THE WITNESS: Absolutely.

THE COURT: Did you ever do the layouts?

THE WITNESS: I didn't do the layouts, either. Quite frankly, I was swamped, and I just didn't have time to get at it.

THE COURT: Did you discuss the Kramer hiring at all with Mr. Sommer?

THE WITNESS: No, your Honor, I did not.

THE COURT: You did not even ask about his qualifications?

THE WITNESS: First time I knew of Dave

Kramer he was already on the job.

THE COURT: Do you remember who told you he would be on the job?

THE WITNESS: I just stated I believe it was Ken Bell or one of our sales engineers. I may have heard it in the rumor fashion a day or two before he arrived, but that is the extent of my knowledge of Dave Kramer.

THE COURT: Do you remember what they said about him when you were told he was coming on the job?

THE WITNESS: No. The only thing I heard was there was a new engineer on board or coming on board, and I am quite sure there were statements that he was a PSI man -- ex-PSI man. That's all I knew about it.

THE COURT: Didn't you say "Well, what is he going to do"?

THE WITNESS: No. I assumed that this man was going to be on C-ring activity.

THE COURT: Would you say it would be a fair statement that, while you were too busy to press a meeting concerning your memo of May 31st, there was no indication that Mr. Sommer was pressing you to meet, either?

THE WITNESS: I know he was not pressing me to meet.

And I might -- I'd like to add, your Honor --

THE COURT: I assume, no matter how busy you were, that if he said "Bernie, I want to talk to you about your May 31st memo," sooner or later you would have gone in there and talked to him about it?

THE WITNESS: Absolutely right.

THE COURT: And you did not speak to him about it and he did not speak to you about it?

THE WITNESS: That's correct.

And I would like to add one thing, if I could: It's very common for me not to meet with Harvey Sommer in a week's business activity any more than once for a period of an hour; under some working conditions, that's how infrequently I see him. In other time periods I might see him every day for a week for a period of an hour.

THE COURT: I guess we are on a conversation with Mr. Kramer when they did talk --

MR. SULLIVAN: Yes, your Honor.

THE COURT: -- about a month after he was hired. So we are maybe probably sometime in the month of July.

Go ahead.

MR. SULLIVAN: Thank you, your Honor.

BY MR. SULLIVAN:

Q His Honor asked if you ever went to Mr. Sommer and said "Hey, I disagree with what Mr. Kramer is going to do." I believe you have already said that you learned from Mr. Kramer that he was going to roll-form and he was going to use a matched metal die.

Did you disagree with any of that?

A Absolutely not. There was no disagreement, and I was quite relieved to see that we were finally moving in the area of roll forming and die forming; and, as I've already stated, my thoughts about rubber press forming or the other method I described were secondary even in my mind as merely considerations. I had no high priority for roll forming or machining -- compressing between flat plates. This memo and I -- my ideas were just related total process, with certainly emphasis on roll forming and die forming and possible applications in some areas for rubber press forming or the other method that I described.

direction and driving this by the power of the horizontal milling machine would perform simple rolling operations.

Q So it is a matter of placing the band in between the rollers, raising the female up into the male shape, and getting your desired form?

A That is correct.

Now, I utilized this concept at Magnatec DSD in roll-forming V's, roll-forming Servo-Flexes and roll-forming any shape seal that I was interested in producing in a flat band.

Q I think that's it. Why don't you mark that BI.

A Now, the technique that we used on the rolling operation I described earlier at Magnatec was utilizing -- I mean Advanced Products -- was using our Bridgeport miller, and the operation I described was done in that manner.

Q Okay. I think that is fine for the rollers.

With regard to the die that was used to make the internal and external, can you describe the die forming? What did it look like and what were its parts?

A Well, I think I can best describe it as I did in the memorandum.

Q I will show you 35, if that helps you.

A The die in use at Advanced Products is an upper and lower metal die -- die segment -- in which one-half the

C is cut into the bottom and one-half the C is cut into the top. It has a single dowel pin on center line, and it is in essence identical to the one I described I used at Magnatec DSD on the one external pressure C that I formed at that company.

Q What differences are there, if any, between the die that you described at DSD and this die?

A The only difference is that on the die I --

Q You are now making reference to AC?

A On Exhibit AC -- there was definitely an opening on the two sides between the upper and lower half, which enabled me to look in during the forming action and do some studying of what went on within the die set. For all intents and purposes, it was identical.

Q Was this opening functional at all? Did it make any difference?

A Not functional in any way.

Q Now let me just show you a picture and ask you if, again, this is a picture of a band that is placed in a die and a picture of a formed seal as it comes out.

A Yes, it is. That's the die and seals, one band unformed and one seal completed.

These dies are in operation. This type of die is in operation at Advanced Products. This particular die has two different sizes cut into the same die half.

Q Do you know when this photograph was taken, Mr. Sniegowski?

A I don't know the precise date that it was taken, but it would have to be sometime after, say, July of '73.

Q Is that a typical picture of a die in use at Advanced Products?

A Yes, it is.

MR. SULLIVAN: Any objection? That should be BJ.

Q We have talked about internal dies. We have talked about external dies. The third die that we have yet to cover is the axial pressure die.

Can you tell me what die Advanced Products uses to form its axial seals, and describe it for the Court?

A Yes, I can. I'd like to use a sketch I've prepared.

Want me to mark this?

Q Yes, why don't you mark that BK.

A The die system, as I reviewed briefly before this, is depicted on this sketch. We use a three-stage system. The concepts involved in this axial die system are, my opinion, in evidence in any -- in most metal forming handbooks and textbooks on the subject of metal forming.

It's commonly referred to as embossing.

In this case we use a purchased washer. The washer could just as easily be made within our shop. We could cut this in a variety of -- any one of a variety of methods. We'd cut the OD or the ID from a piece of sheet metal and make this washer blank.

We made a female lower half die and a male upper half die, and, by pressing these two--this also utilized a single center dowel pin--we bring this down and create the first pre-formed shape.

The second stage of this die is to take that pre-form, position it into another die which has that pre-formed shape machined into it, and it has a V-like shape beneath it, and we press that pre-form into a semifinished C-like shape. The pressure, of course, is caused by this vertical ram on the upper die, and that die ram width is designed to clear the inside of this C width, so that when we make the closure the return is not in any way distorted.

The third stage die is a final closing die which, in essence, is an upper and lower half of a full circle machined into the two die segments. As depicted here, this concept is distinctly different from that concept that Pressure Science has explained in their testimony.

Q Okay. We will Get to that.

With regard to the washer that you put in there, that is typical of the washer that is attached to AB; it is a flat washer; and then the segment on AP represent the stages of forming thereafter?

A Yes. This exhibit discloses the principles of the four stages involved in that forming operation.

Q With regard to that forming operation, I believe you testified yesterday that essentially it is similar or identical to the concept of the rollers; in other words, you start with one shape and you gradually --

A That's correct.

Q -- pull it or roll it into another shape?

A That is true.

Q I do not have the exhibit number -- maybe I do -- well, it is up on the board --

MR. SULLIVAN: I will get that for your Honor's notes later.

Q -- but yesterday you drew a split drawing which compared the rollers to the embossing die that you have just described.

With respect to the die forming technique that you have just described, it is your testimony that that is something that is discussed in the literature?

A Yes, it is.

Q Let me show you an excerpt from "Materials Property & Manufacturing Process" and ask you if that is typical of the literature.

A This is taken from my textbook on manufacturing engineering, generally used to explain principles of metal forming, and there is a view here on this page, in table V-1, that clearly shows the concept of embossing, and that is the conversion of a flat sheet into a shape identical to that technique I described.

Q What figure is that?

A Embossing, table V-1.

Q That shows the concept of forming a piece of metal, pushing it into a cavity where the piece of metal on the top has the shape that you desire to get it into?

A Yes. Right.

MR. SULLIVAN: I would like to offer as our next exhibit an excerpt -- it is a Xerox copy -- of pages 294 and 295 from Datsko, Materials Property & Manufacturing Process, publication date 1967.

THE CLERK: BL.

MR. SULLIVAN: BL, your Honor.

BY MR. SULLIVAN:

Q I have placed in front of you two illustrations that have been marked as 20-H and 20-K.

Were you in the courtroom when these illustrations were --

A Yes, I was.

Q These illustrations depict PSI's 90-degree die; do they not?

A To the best of my knowledge, this is the PSI system for axial pressure seals.

Q Let me show you what has been marked as Plaintiff's 47 and ask you if you can tell me if that is one of the PSI --

A Yes, it is. I believe this is the PSI system that's been demonstrated in the courtroom.

Q Can you with reference to those illustrations and that die tell me what differences, if any, exist between the method that Advanced Products uses to form its axial seal and the method PSI uses to form its 90-degree seal?

A Well, it's apparent to me that, as this process was described in the court, this is essentially a one-stage operation, but the forming operations that take place while the seal is being formed are completed in one stroke of the press, so I would call this a one-stage operation. We use a three-stage operation.

The die is obviously a far more complicated die.

This one is four pieces at a minimum, five if you count the center dowel. It's a very complicated method. I'm sure it does the job suitably, but it is not performed in the same manner that we do it in that system that I've described on BK.

There is also other testimony that was given, as depicted in this sketch, on the upper left-hand corner of 20-K, that PSI also utilizes a vertical band with a pre-form and rolls that band, that pre-formed band, into a C-like shape, as I've depicted in this final view. Again, we do not use that concept. We do not make axial pressure seals from vertical bands.

PSI has indicated that they use both techniques, and I am not exactly clear when they use which, but they have agreed to both methods. Our method is distinctly different.

Q From both of them?

A From both of them.

This is another view, 20-H, that shows other -- another system, which I think is a supplementary sketch to the first one, but it shows the relationships of die forming with multipart components.

Q I neglected to show you what has already been marked as Plaintiff's Exhibit 40.

Is that also a piece of literature which discusses the concept of embossing?

A Yes. This exhibit, Plaintiff 40, was introduced initially during the deposition as an example of the concept involved in our die system, and it is public literature, taken from a textbook, a textbook on drawing of shallow parts. Here it shows a flat washer which -- washer-type shape -- which has been converted into a U which is essentially a similar configuration to this. In this particular instance the precise shape is not exactly the same as the shape that I have depicted, but the concept of forming with a female die and a male punch and creating a U-like shape from a flat washer is depicted very clear. In this particular instance, rather than that shape, I'll reverse this drawing, but the shape is sort of a semi-finished cup washer. And this concept is identical to the concept that I've disclosed in this Exhibit BK.

Q I believe we have now covered the methods that Advanced Products uses to die-form; and I mean the internal, external and axial dies.

Assuming David Kramer was not hired by Advanced Products, do you have an opinion based on reasonable probability as to how long it would have taken Advanced Products to make each of the dies -- that is, the internal, external, axial -- assuming Advanced Products started that effort on May 31, 1973?

A Yes, I do.

Q What is that opinion?

A If we were given the proper priority to implement the activity to produce these dies, the die system we have just described, it would have taken less than ninety days.

Q What do you base that opinion upon?

A I base that opinion upon my personal experience in metal forming and also the fact that I was fully cognizant of the techniques of making a C from a matched metal die. We had had numerous discussions in the early months of '73, and all of the principles and concepts that we have now incorporated were fully discussed and known by all the personnel at Advanced Products. It was merely a case of getting the release to institute the program of metal forming on a production basis.

Q You said assuming you had the proper priorities.

Was the necessary personnel -- and I just mean the necessary time available of the people working at Advanced Products -- was that present in May 1973, in your opinion?

A No, it was not. In my opinion, we didn't have enough supervisory personnel, for one thing, and -- well, that's the main problem we had, insufficient personnel to get the project moving.

Q So the only qualification you have is if you had a body to turn loose on the project; is that correct?

A That's correct.

Q Can you tell me, Mr. Sniegowski, whether you have ever solicited quotations from metal stamping houses to determine if Advanced Products could purchase dies to form its metal C-rings?

A Yes, I have, personally.

Q Can you tell me about that?

THE COURT: When?

THE WITNESS: Just prior to the deposition.

THE COURT: All right.

A I made a survey of several commercial stamping houses in the Waterbury and Southington area. I visited one company called American Standard, and I went in there with a band. I showed 'em a product drawing of ours and I asked the general manager, who was essentially a toolmaker by trade and who had expanded his capabilities into a small die-forming house, what he thought of this as a project. I asked him would he be interested in producing formed C-rings if I supplied a band. He looked at the band, he looked at the product drawing, and he was very interested.

Is that a combination or did the 23 include the 15?

A I believe they're both independent. The welder alone was 1500 range, and the TIG fixture, counting the subcontractor and the subcontract designer and machine shop activity, was in that range of 2300, I believe.

Q Assume Advanced Products did not hire Dave Kramer and further that Advanced Products decided to precision metal form metal C-rings on May 31, 1973.

Do you have an opinion, based on reasonable probability, as to how long it would have taken or may have taken Advanced Products to produce MCR's on a production basis using precision metal forming techniques?

A Yes, I do.

MR. KELLY: Objection, your Honor.

This question was asked yesterday, I believe.

THE COURT: That is what I thought.

MR. SULLIVAN: I can explain the difference, your Honor.

THE COURT: All right. Well, rather than explain the difference, why don't we just go right to it.

What is your opinion?

THE WITNESS: My opinion is that it would be in the vicinity of six months.

BY MR. SULLIVAN:

Q What do you base that opinion on?

A My over-all general experience of eight years in metal seal -- in the metal seal business, and my background concerning forming techniques that I've accumulated over the past twenty years, twenty-five years, in the industry; the fact that I was chief engineer at Magnatec, grossly involved, deeply involved, in metal seal fabrication, utilizing concepts of roll forming, TIG welding.

THE COURT: Excuse me. I do not mean to interrupt you, but I thought I heard this before.

MR. SULLIVAN: The question I asked him yesterday was how long it would take them to make the dies. This question includes work beyond the die. It would include finding presses.

THE COURT: All right.

Q Is that correct, what I have just told his Honor?

A Yes, it is.

Q I believe you testified yesterday that you thought you could make the three dies within ninety days?

A That is correct; I did say that.

Q But other things had to be done?

A Absolutely.

Q What other things would you have to do?

A Well, we'd have to buy the -- shop around and purchase the presses, the roll forming equipment, the DeStako -- Di-Acro bench models. Just evolution of the total manufacturing equipment plus the techniques that we've described.

Q You would have to come up with some sort of fixture to weld?

A Right.

Q These were used presses you bought; isn't that correct?

A That is correct.

Q You would have to find those?

A Yes, I would.

Q Since David Kramer has joined Advanced Products but prior to the inception of this lawsuit, have you learned anything concerning metal C-ring production that you were not aware of before?

A No. I have not. I did not, I should have said. I did not.

Q Since this lawsuit has commenced, have you learned anything about MCR production that you had not previously known?

A Yes, I did.

Q What was that?

A Well, I certainly learned that the -- the principle of pulse plates as applied to stress-relieving of C-rings was a new concept to me. That's brand new piece of knowledge. I also learned for the first time the idea of planishing a weld with contoured anvils, statically planishing. By that I mean a single force, a single blow. But in regards to that general subject I was well aware of planishing by roll forming with contoured rollers. This is in the literature and common knowledge. So I did learn planishing statically with contoured anvils. This was a new concept that I really thought about or heard about.

Q Anything else?

A I guess that's about it, those two items.

Q Let me show you what has been marked as Plaintiff's Exhibit 46 and ask you if you can tell me what that is.

A Yes, I can.

This is an exhibit that we submitted during the deposition, and it's identified as Plaintiff's Exhibit 46. It's literature duplicated from a metal forming handbook published by the ASM, American Society For Metals.

A Very, very brief mention of that general subject.

Q I would like to ask you a series of questions about Exhibit R, Mr. Sniegowski. I will give you the exhibit here to refer to.

A Could I also have that summary that we've -- refers to this memo?

Q Can you tell me, to the best of your recollection, Mr. Sniegowski, how long it took you to write the memo?

A Yes, I can.

Q How long?

A Probably a couple hours.

Q So it was within a day?

A Yes.

Q You have no doubt about that?

A Right.

Q Exhibit R is dated May 31st?

A Yes.

Q Do you recall if that was the same day that you prepared it or whether --

A I think I may have had it done a day earlier.

Q Now I am looking at the opening paragraph in the memo. It speaks about "a recent meeting on the subject."

Can you recall when that meeting was?

A I can't name the day or the date.

Q Well --

A Approximately I can.

Q Let me put it this way:

You wrote the memo around the 30th of May?

A Right.

Q When you talk about "a recent meeting," can you put it in terms of a week or ten days?

A It was within one to two weeks prior to that memo that I had at least one meeting.

Q You refer specifically to "a recent meeting"?

A Right. That's the one I just mentioned.

Q That would have been around the 15th of May on?

A That's correct.

Q Then you say, "It may help to collect some random ideas for consideration."

What was your purpose in preparing this memo?

A To collect all the methods that had been discussed as feasible production approaches to metal forming, put 'em in one memo.

Q This would have been the discussions that were taking place over the past six months?

A That's correct.

Q In paragraph one you address "An obvious problem to resolve is selecting the most simple method"; is that shape was in your hypothetical question.

Q You answered in your deposition testimony that if you did that, if you put it between two flats, you would get a mongrel shape; didn't you?

A Yes, I did.

Q You would get a U-shape or a V or a Z?

A Yes, I did.

Q Is that what you thought would happen--

A Yes.

Q -- at the time you wrote this memorandum?

A Yes.

Q Let me ask you this, Mr. Sniegowski:

You are an engineer, and you have testified about long experience in seals, and you are putting together here, as I understand, a memo which is supposed to represent a summation of your discussions. Why would you have included a step that you obviously knew or you could have checked in four hours would have turned out a mongrel-shaped seal?

A Well, a mongrel-shaped seal doesn't mean it wouldn't be a product that we could sell. That's why it's in this memorandum. The precise shape of the C, forming of metal C's from bands -- the C was not necessarily depicted precisely. A mongrel U, for that matter, is a salable product.

Q All right, Mr. Sniegowski. You were not talking about mongrel U's in this memo; were you? Is that the subject of this memo?

A I'm talking about many, many things, and we had discussed imperfect C's versus perfect C's, so when I put that item in this memo I think it was a related topic concerning the forming of metal seals from bands, specifically metal C's from bands.

Q Mr. Sniegowski, let's go to paragraph eleven, sub four, where you mention a metal die split, and you also said "See my layouts blank and blank for further details."

You have testified, I believe, those layouts were not made; is that correct?

A That's correct.

Q I believe in response to a question by the Court you testified with respect to what you would have included in those layouts had you made them; isn't that true?

A Yes, I did.

Q I believe that you told the Court that if you had made those layouts you would have included the concept shown in Exhibit AO, which is roll and die forming of axials, according to my notes; you would also have included concepts depicted in Exhibit AC, which, according to my

Q In paragraph fourteen, Mr. Sniegowski, you refer to a completed plan to start with rubber press forming the first stage lip.

I take it that plan was not in writing?

A That is correct.

Q This was something that you had in mind that you were going to explain, that you intended --

A I intended to review that plan fourteen with Mr. Sommer.

Q If we go to paragraph fifteen, in paragraph fifteen you are talking about fabrication of an externally pressurized C; aren't you?

A That's correct.

Q And you mention some discussion here about alternatively using matched metal die for a limited first phase of the work or I take it for forming the entire C; is that correct?

A I don't understand your question.

Q My question is I am trying to understand what you referred to in paragraph fifteen. I read, "You commence with straight mechanical matched metal die"; altnernatively MMD's would be the limited first phase of work in reference to fourteen, which is rubber press forming. So at that point in paragraph fifteen did you have

A That's correct.

Q The other entry covers from the date of the preliminary injunction to April 8th?

A That is correct.

Q You kept track of that time and gave it to Mr. Sommer?

A Yes, I did.

Q Advanced Products makes its metal C-ring to customer drawings; doesn't it?

A For the most part I'd say they are -- almost in all cases.

Q So that C-shape looks like that because the customer tells you he wants it to look like that?

A Yes.

Q Pressure Science did the same thing?

A I'm not positive of that, but I believe so.

Q Mr. Kelly asked you a couple of questions about the axial die that Advanced Products uses and asked you whether in your judgment the axial die was a cheaper die to make than the Exhibit 47 that Pressure Science evidently uses; you recall that?

A Yes, I do.

Q And you told him you thought it was cheaper?

A Yes, I did.

Q Can you tell me why?

A Simpler cutting operations, less pieces, less number of pieces. I think this would be far more machine shop type, far more cutter grinder time. In general, it's a more complicated die because of the complexity of the multicomponent pieces -- segments.

Q Mr. Kelly asked you a couple of questions about BW; and I believe it has been testified that it is your understanding that Pressure Science uses independent fingers, they move independent of each other?

A That is my understanding.

Q Up here this depicts Advanced Products' holding flippers?

A Right.

Q What is this dot here?

A That represents a through bolt. It goes in a plane 90 degrees to that flipper and it fastens together each of the individual segments of that solid hold-down assembly.

Q Do those individual segments move independently of each other?

A No, they do not.

Q So the flipper comes down and is, in essence, as an integral unit?

* * * * *

EXCERPT FROM THE TESTIMONY OF ARTHUR HOSTAGE

ARTHUR HOSTAGE, called as a witness by the defendants, being first duly sworn, testified as follows: that he graduated from Yale University with a bachelor of arts degree in economics in 1948 and is employed at defendant Advanced Products as vice-president, secretary and treasurer [2101-02]; that after graduation from college he was employed as a management trainee in a machine company [2102]; that prior to helping found Advanced Products, he was employed at DSD-Magnatech, another metal O-ring seal producer for over three years [2103-2105]; and that he is responsible for marketing at Advanced Products [2108]. Mr. Hostage further testified in part as follows:

* * * * *

what his prior employers had done.

In the second place, we felt that we knew the conventional forming techniques which had been discussed many times, and we weren't waiting to find out what PSI was doing. We assumed they were doing things which people normally do to form pieces of metal into certain shapes.

And the third general reason is that when you are interviewing somebody for a position, you tend to try not to pick their brains for what they knew of their prior positions, because they might feel that that was all you are interested in; in other words, that you weren't interested in them but you were interested in information which they might pass on to you, and that their value as a poten-tial employee might thus be diminished.

Again, we were after the man; we were not after the -- his prior employer or his prior employers.

Q Was Dave Kramer's interview typical of the kind of interview that could be conducted at Advanced Products for a similarly situated position?

A Yes.

Q Can you give me an example of somebody you might inter -- in the not too distant --

A Well, I can give a very specific example.

Sometime in the eighteen or thirty months prior to June of 1973 we learned that a man named Gary Dusenbury was looking for a position with a company manufacturing special metal seals. We had met Mr. Dusenbury at -- sometime prior to that -- when he was employed by the Rocketdyle Division of North American Aviation in Kanoga Park, California, where he then was on the staff as a project engineer with responsibility for steel design and specification for the rocket engines which Rocketdyle produced.

Subsequent to our knowledge of and acquaintance with him in that position he left Rocketdyle and worked for some time with a company called Parker Seal Company, which is part of a larger group and which is primarily in the rubber seal business but has probably eight or ten other different designs, including two or three metal seal designs, and he went with them on the metal seal side. For some reason which I don't recall -- and I am not even sure we ever knew -- he decided to leave Parker, and he was casting around to -- for another position with another metal seal manufacturer, because this was the industry with which he was most familiar.

Q Did you interview him?

A We brought him to North Haven and interviewed him. Again, we were looking at the man. We knew of Parker Seal's products. We knew at least some of the different designs which Rocketdyle had used, not only which Rocketdyle had purchased from metal seal vendors, but North American Aviation had their own metal seal division. This was a little bit tough, because you were competing with an in-house supplier. And so, of course, he was familiar with the work which they had done.

We had no interest in learning the manufacturing processes by which Parker made their metal V-seal or their metal -- their Mark II metal V-seal, because we knew in the case it was machined and in the case of the other it was formed, and we assumed it was done by the conventional means by which you would push metal into such a shape. What we were most interested in was the type of person Mr. Dusenbury was; and toward that end I would ask the same questions, same type of questions, that I had asked of Mr. Kramer. I wanted to find out what kind of a guy he was, wanted to find out whether he would assume some initiative, if he could assume initiative and exercise it without stepping on toes and breaking noses all the way around.

So we had this interview. We made Mr. Dusenbury an offer, the details and mechanics of which I forget completely. He advised us within several days he was happy to accept our offer, and about two weeks after that he had advised us that he had withdrawn his acceptance because he, after further discussion with his wife, had decided they were going to get out of the industrial rat race -- I believe that's the quotation -- and go back to his home state, which was Montana, and be in the country.

Q Before you made Mr. Dusenbury the offer, did you check with Parker to see what kind of a guy he was?

A No.

Q Why?

A Well, we normally don't. Somebody leaves a place, he leaves for some reason. You are apt not to get a very accurate reading of what kind of job he really did do.

Q Was Mr. Dusenbury a college graduate?

A Yes.

Q Did you check his academic credentials?

A No.

Q You mentioned earlier that when Mr. Kramer came to you he was offered 22, and there was some form of additional compensation, a bonus at the end of the year, which I believe you said was in the discretion of the management.

Who is management?

A Mr. Sommer and myself.

Q What is the range of that bonus historically? What does it go from and what can it go to?

A Anywhere from a hundred to two thousand.

Q Do you know whether Mr. Kramer got a bonus last year?

A I believe last year not. I believe in 1973 about $200.

Q Let me show you what has been marked as Defendants' Exhibit II and ask you if you have seen that before.

A Yes, I have.

Q Are you generally familiar with its preparation?

A Yes.

Q There is an entry here, "Deposition only," and then there are initials of Mr. Sommer, Sniegowski, you, Mr. Kramer, and there is an entry, 490.

Can you tell me what time period that covered?

A That covered the period of time up to and including the depositions and on up to the hearings for a preliminary injunction.

Q That included time with counsel?

A Time with counsel, research time and preparation for deposition, time at deposition.

Q Time preparing for the preliminary injunction?

A Yes.

Q There is another entry above that which says for the same individuals, or most of the same individuals, and there are hourly entries there, and it says research time through April 8th.

What time period does that cover?

A That covers the further research and preparation for the actual trial in which we're sitting.

Q Up through April 8th?

A Yes.

Q Does that also include time with counsel and time preparing for trial?

A Yes.

Q It is not just research?

A No.

Q Do you have any reason to believe that any of the hourly entries on here, whether they be an actual hourly entry or an estimate, are at all inaccurate?

MR. KELLY: Objection, your Honor.

THE COURT: Overruled.

A No. No. Those times were prepared under the direction and by our controller, and I would and do consider them as valid as I would consider any other figures that he makes for any other purpose.

MR. SULLIVAN: I have nothing further, your Honor.

BY MR. KELLY:

Q Mr. Hostage, as head of advertising, are you familiar with ads placed by Pressure Science for their product?

A Generally, yes.

Q Were you aware that the ads had variously referred to a proprietary or an exclusive process?

A Yes.

Q Did you discuss at the time you were hiring Mr. Kramer whether or not his employment might contravene some claimed proprietary process of Pressure Science?

A We didn't believe the claim, Mr. Kelly.

THE COURT: Would you mind telling me a little bit more about that.

THE WITNESS: When I say we didn't believe the claim, it was because in your -- in my experience, if someone advertises something where there is something original, it's protected by a patent, and the advertiser is quick to say it; otherwise, if he says "exclusive," "original," what an advertising agent would call puff words, in general my response is this has no meaning. If somebody was trying to attract attention in a Madison Avenue way, my understanding of it is it's not significant

THE COURT: I am not sure, though -- I just want to be accurate on this: Is this conclusion that you form in your mind based on claims that you see made by many people who advertise, many companies, or did you have this conclusion with respect to Pressure Science's ad?

THE WITNESS: A general reaction. It's like the laundry in Hartford, it says 3-Hour Laundry, but it takes you a week to get your shirts. Or the companies which advertise, distribution companies, which say "If we get an order by one o'clock, we'll ship the same day"; they may do for somebody, but they never ship yours that same day.

THE COURT: Did you ever discuss this with Mr. Sommer prior to this lawsuit, the fact that PSI is claiming proprietary rights to any process on the C-seals?

THE WITNESS: No, sir.

THE COURT: That was never discussed?

THE WITNESS: No, sir.

THE COURT: And never discussed with Mr. Kramer?

THE WITNESS: No.

MR. KELLY: No further questions, your Honor.

THE COURT: Redirect.

MR. SULLIVAN: Just one question.

REDIRECT EXAMINATION

BY MR. SULLIVAN:

Q Let me back up:

In answer to his Honor's question, you did not understand, as I take it, that Pressure Science was making any such claim from reading their literature, is that correct, prior to the institution of this suit, any such claim that their processes were confidential with respect to C-ring manufacture?

A No.

Q With regard to Mr. Kramer's interview, do you recall that in that interview Mr. Kramer told you that he wanted to stay in the seal business?

A Yes.

Q You recall that he also told you that he was looking for jobs with other seal manufacturers?

A Yes.

Q Did you ever ask Mr. Kramer whether he had signed a nondisclosure agreement in those interviews?

A No.

Q Mr. Sommer?

A Not to my recollection.

Q Can you tell me why you did not ask him that?

A It didn't seem to be a real question. The product which has -- which PSI made and which other companies before 'em had made were not secret in nature. They could even to a lay person be made by techniques which were recognized by even a lay person in the industry, and what could be secret about them? We didn't think about it as a serious question.

MR. SULLIVAN: Okay, I have nothing further.

THE COURT: Mr. Hostage, I perhaps should know this, but perhaps you can help me out:

Is that a photograph or is it a drawing, or what is it?

THE WITNESS: I believe that is a photograph which is retouched with an air brush or something to create these highlights.

THE COURT: Okay. How about something like on page 2?

THE WITNESS: The same one.

THE COURT: It is the same one?

THE WITNESS: Yes.

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EXCERPTS FROM THE TESTIMONY OF CLIVE R. DIGGINS

CLIVE R. DIGGINS, called as a witness by Advanced Products, being first duly sworn, testified as follows: that he is presently employed by A&L Parts Specialties in New Hartford, Connecticut [2133]; that he was formerly employed by DSD-Magnatech as an experimental welder [2137-39]; that he worked directly for Bernard Sniegowski while at DSD-Magnatech [2161]; that he was directly involved in the production of formed metal-C-rings at DSD-Magnatech [2151, 2158-59], and that he voluntarily left DSD-Magnatech to join Combustion Engineering as a nuclear welder [2160]. Mr. Diggins testified in part as follows:

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BY MR. SULLIVAN:

Q What equipment did you use to perform the welding? Was it TIG welding equipment?

A TIG welding equipment. It was a typical power packed or TIG weld, a heli welder, whatever you wish to call it, which was purchased from Airco. It was a 1½-amp low-range machine.

Q Let me show you three photographs and ask you --

MR. SULLIVAN: Maybe I will have them marked for identification first. I would like to have three photographs marked for identification, starting with C --

THE COURT: L.

MR. SULLIVAN: -- L; okay.

THE CLERK: CL-1, 2, 3?

MR. SULLIVAN: Yes, CL-1, 2, 3.

Q Now let me show you these photographs.

Can you tell me, first of all, where they came from?

A These two photographs were taken --

Q Referring to CL-1 and CL-2?

A These two photographs were taken by myself of just the general equipment in the area which I used. This particular picture was taken -- CL No. 3 was taken at an earlier time by someone else of me at work, at my workbench at State Line Oil Company -- I should say the temporary plant in '68.

Q While you were an employee at DSD?

A Yes, that's correct.

Q Can you tell me why these photographs were taken?

A Photographs were being taken at DSD Company -- was -- yeah, very common occurrence. Mr. Sniegowski, himself, took many photographs of the equipment for publicity or for general record, and quite frequently photographs which did not turn out suitable for those purposes would be passed on to the general help if they wished a copy, and if someone wanted to take a picture of something there was no objection that I know of.

Q Did you take those to use them in your job portfolio at some point?

A I took them to use possibly as a -- for a job portfolio and also for my own personal record.

Q While you were at DSD, did anybody ever tell you you were not supposed to take photographs or should not reveal what you learned there about the manufacturing processes?

A No, it was -- nothing was said whatsoever. It was a very open shop.

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EXCERPTS FROM THE TESTIMONY OF EDWARD A. BARTON

EDWARD A. BARTON, called as a witness by Advanced Products, being first duly sworn, testified as follows: that he is president of the J. C. Barton Company in East Hampton, Connecticut, a charter member of the National Tool & Die Precision Machining Association; that he has been president of Barton since 1948 [2239]; that he is a high school graduate [2240]; that his duties at Barton include the design of dies [2244, 2247]; that his company had gross sales of approximately three-quarters of a million dollars in 1973 [2243]; that his company employs about forty people [2242]; that his company is one of the largest tool and die companies in Connecticut and it specializes in the design and manufacture of special tools and special dies [2243, 2247]. Mr. Barton further testified in part as follows:

* * * * *

EDWARD A. BARTON, called as a witness by the defendants, having been first duly sworn by the Clerk of the Court, was examined and testified as follows:

THE CLERK: Please state your name and address for the record.

THE WITNESS: Edward A. Barton, B-a-r-t-o-n.

THE CLERK: Your address, please?

THE WITNESS: East Hampton, Connecticut.

THE CLERK: Thank you. You may be seated.

DIRECT EXAMINATION

BY MR. SULLIVAN:

Q Where are you presently employed, Mr. Barton?

A At the J. C. Barton Company, East Hampton.

Q What is your position there?

A President and general manager.

Q How long have you been president of the J. C. Barton Company?

A Since 1948.

Q When did you join the J. C. Barton Company?

A In 1940.

Q Where is the J. C. Barton Company located?

A 5 Skinner Street, East Hampton, Connecticut.

Q Now would you trace for the Court, starting with your high school education, your education and employment from the time you graduated from high school to the time that you joined the J. C. Barton Company in 1940?

A I graduated from high school in 1932; spent from 1932 to 1936 with my father in the tool and die business.

Q Where was that?

A At the -- East Hampton, Connecticut.

Q What was the company's name?

A It was J. C. Barton, not incorporated at that time.

Then business -- there was practically no business in that '35-'36 time, and I went to the Ford Motor Company, a Ford dealership in Middletown, and stayed there from 1936 to 1940; when I left I was foreman of used cars.

And in 1940 I came back with my dad, the tool and die business again, and have been there from then until now.

Q Are you a member of any professional organizations in the tool and die industry?

A Yes, we're a charter member of National Tool & Die -- precision machining association.

Q When you say "we're," you mean your company?

A The company, yes.

Q When did it join that?

A About 1942.

Q Has your company been the recipient of any distinctions or awards in its business?

A Well, we're certified vendor for Raytheon Company, submarine parts, that type of thing.

Q Is that a difficult thing to obtain?

A It is in that you are -- being a certified vendor, the quality of your product must be up to the -- if you are certified vendor, your parts can go in without inspection.

Q Are you generally familiar with the tool and die industry, and, if so, how do you keep up with it?

A Yes. We read periodicals and so forth, go to association meetings, and visit other shops.

Q Have you visited other shops in Connecticut and outside Connecticut during the course of your involvement in. this industry?

A Yes. I've been in Ford Motor, Chevrolet, various plants, all of whom have tool and die shops, Moore Special Tool in Bridgeport, B-Jon, New Britain, who is now out of business but was one of the biggest shops in Connecticut.

Q Now would you describe for the Court how your company or how the J. C. Barton Company grew? You say you joined it in 1940. How did the company grow over the years? What size was it, approximately, in 1940, and, if that changed, when and why?

A Well, in 1940 we had about six people, and did from '40 to '45 largely war work, Second World War. I don't think we had that many more people, perhaps nine or ten people, by the end of the war. And since then we have branched out -- at that time we were also doing -- or shortly after the war we were doing Bell work for the plants in East Hampton, which is tooling for Bell and automotive tooling, and we gradually grew to -- in tooling and precision machining -- to approximately forty to fifty people, present time.

Q Focusing for the moment on the company as it exists today, you have how many employees?

A About forty right today.

Q The J. C. Barton Company is a Connecticut corporation?

A Right.

Q When was it incorporated, generally, if you know?

A I believe 1952, around '50.

Q Does the J. C. Barton Company have any subsidiary?

A Yes, we have a Pressure Pak Corporation.

Q Where is that located?

A At 25 Skinner Street, next building to us.

Q How many people does that employ?

A About -- around fifty people.

Q You are president of the J. C. Barton Company. Who are the other officers?

A My brother is vice-president, James C., Junior; and another brother's secretary jobs, is S. Barton.

Q What was J. C. Barton's gross sales for the last fiscal year? And, if it changed significantly, tell me that, too.

A Well, I think like everyone else we're a little low last year, about three-quarters of a million, but we have been to a million and a quarter.

Q If you were asked to describe what the J. C. Barton Company's business is, how would you describe it today? What do they hold themselves out as doing -- or itself out as doing?

A The designing and building of special tools and equipment, special dies, tools; also special machining.

Q Is it fair to say that you hold yourself out as a specialists in die design work?

A Yes. We do.

Q Who at the J. C. Barton Company is involved in that die design work?

A Myself, my brother and one other engineer.

Q What types of dies does the J. C. Barton Company design and make, in terms of complexity and cost, if that --

A Anything from a simple die of 150, 200 dollars up to a $25,000 progressive die.

Q Are the dies that you make dies where close tolerances are important? Do you get into that kind of die design?

A Yes, definitely.

Q Can you give the Court an indication of the kind of tolerances you normally work within?

A We normally work probably one to two thousandths, although there are cases where you have to be in tenths of thousandths.

Q You have testified that your dies run the gamut from simple ones to complex ones. Are the complex ones referred to as progressive dies?

A Could be a progressive or compound.

Q What is a progressive die? Could you describe for the Court what that is?

A A progressive die would be one that normally would feed strip into it and the completed part come out, and it might go through three -- anywhere from two to six or eight or ten operations to complete it, the completed part on the other end of the stress, so that each stroke of the press a completed part comes off.

Q Let me show you this and ask you if you recognize this, and tell me what it is.

A This is our brochure.

Q When was that first published by the Barton Company; do you know?

A We've had them back probably fifteen years. This one I think is perhaps five years old.

THE COURT: Has that been introduced?

MR. SULLIVAN: I am going to show it to Mr. Kelly and offer it, your Honor.

Do you have one?

MR. KELLY: I do not know if it is the same one.

THE COURT: There being no objection, it may become a full exhibit.

MR. SULLIVAN: Thank you.

That should be CM, and I will describe it for the record. This is a brochure for the Barton Company which the witness has identified was published sometime in the last five years.

BY MR. SULLIVAN:

Q Can you tell the Court basically or briefly what industries the Barton Company has served over the years?

A Since we started in East Hampton there was the Bell industry was about the only industry in town, so we made Bell tools, Bell dies. Then we served electronics, automotive, aircraft, submarine.

Q Take the aircraft industry. Have you made dies for anybody in the aircraft industry?

A Yes, we've made some dies for jet engine parts.

Q Who was that for?

A Pratt & Whitney.

Q How about the automotive industry? Have you made dies for them?

A We've done most of our work for the automotive industry.

Q Who for the automotive industry have you done your work for? What companies that the Court would know about?

A Well, there's one right here in New Haven where we do a lot of our work, C. Coles & Company, and a large part of that would be Chevrolet tools.

Q Have you also done work for Ford and Chrysler?

A Yes.

Q Can you tell the Court what the relative size of Barton is in Connecticut for a tool and die company? How do you rank?

A I would guess, strictly a die shop, we're one of the larger ones.

Q Do you know of any bigger ones than you?

A I don't know.

Q You have already told me that your duties at some point at least involving the design of dies -- you are the president of the company. What other duties do you have at Barton?

A Just about all the duties of a small company, which runs the gamut, but largely design and sales.

Q You are involved and familiar with all phases of the operation?

A Right.

Q Can you tell the Court, describe for the Court, how a customer comes to you normally and how you go about quoting him on a part which he would want to have formed and a die that you would design and make? How dies that work?

A Well, I would have to know what his -- I assume he's giving me a blueprint or a part.

Q Is it customary that he does that?

A He would have to give me a blueprint of the part or a sketch of the part or something.

Q Right.

A Then we would design the tooling for him. That's the way it's normally done. We would have to know a few things -- type of his equipment, what he's going to put this particular tool in.

Q Why do you have to know that?

A Because he might have a big press or he might have some simple machine. He might have a simple or bore press or he might have a vice. In other words, we have to know what -- where we start.

Q Okay.

A We'd also have to know what his production is. If it's either low production -- one low production or high production, you might think entirely different.

Q Why would that affect your thinking? Just explain to the Court how low production affects your thinking and how high production affects your thinking.

A If the -- low production, which might be 50 to 100 pieces or 500 pieces, you would put a lot less die cost in and substitute some hand labor, putting the part in. If you were -- if it was high production, which might be three, four, five thousand per hour, then you would go -- you might go eight to ten thousand dollars in a tool or you could afford a lot more money in the tool.

Q What else should you know?

A I would think you would have to know the material, how it's going to be supplied to you --

Q Right.

A -- and want to know whether he had any money or not.

Q When you --

THE COURT: Or good credit?

THE WITNESS: Right.

BY MR. SULLIVAN:

Q When you quote on this business, how do you quote it? Do you quote the design separate from the making of the die or do you roll it all into one figure?

A We normally supply a -- quote a die design and bill it.

Q So you try to figure in that how much time it's going to take to design it and the material costs for the die; right?

A Right.

Q Since you give him one figure, if it takes you longer to design it, that is your problem, and if it takes you less time you make more money?

A Right.

Q Those are your dollars?

A Right.

THE COURT: What is the biggest die you have ever designed and made in size? How do you measure dies, diameter or --

THE WITNESS: Well, we've made dies for -- I quoted one the other day for a solar heat panel for Raytheon which would be about -- the part would be three feet by six feet, and the die would be somewhat larger than that.

THE COURT: That is about the largest?

THE WITNESS: Not really. I've seen them bigger.

THE COURT: How big have you seen them?

THE WITNESS: Automobile body sections.

THE COURT: Is that a die?

THE WITNESS: Oh, yes. Most everything is formed on a tool or die of some type. Fenders.

THE COURT: Thank you.

MR. SULLIVAN: I am getting into an area where I want to show the witness a drawing, and I think it will be easier if I could get it marked before I show it to him. I am trying to get an exhibit, your Honor. It is tangled up in the -- I probably could use another.

Any objection?

MR. KELLY: No.

THE COURT: Mark it Exhibit CN for identification.

MR. SULLIVAN: Exhibit CN -- I will just describe it for the record -- is an Advanced Products drawing of a C which was actually drawn on April 21, 1975. It is typical of the kind of drawing that they do.

THE CLERK: Is that a full exhibit?

MR. SULLIVAN: It is for identification now.

THE COURT: Yes, because the witness has not identified it.

MR. SULLIVAN: Right.

BY MR. SULLIVAN:

Q Now let me show you this.

Assume that Mr. Sommer came to you in the spring of 1973 and he showed you that drawing which has been marked for identification as CN and he showed you a sample C-ring, as I have in my hand, and he showed you a band which, had he done it, would have been the same size as this, and he said to you, "I'd like to die-form this band into this shape, and the tolerances that are going to be required for this operation are similar to the tolerances set forth on Exhibit CN," and he further said to you that he anticipated low volume production initially, ten to five hundred pieces, but that he had hoped for future orders, so he would like an inexpensive but durable die; and, lastly, that he said to you that he envisioned the need of making C's of many different configurations, three or four hundred different sizes; and, lastly, that he said that he would like to form the part or put the die in hydraulic press or some inexpensive press.

Do you have an opinion, based on reasonable probability, whether your company could have filled such an order for Mr. Sommer in the spring of 1973?

A You said three or four hundred configurations.

Q No, no, I meant sizes, different diameters.

A But the same configuration?

Q Yes, the same C configuration.

A Yes. No problem.

Q Now would you tell me how you would have gone about designing such a die, what that die would have looked like?

A Well, one thing we know, we have the sizes for the die on the print, because we have to fill the cavity with -- with metal. We'd have to -- this would be our shape of a die. We'd have to fill that with metal. Therefore, you have to put that shape in some manner into a tool steel die, a tool steel, so that you can harden it and make it smooth, so that the metal will slide. Then it would have to be so you could get the part out. This means that there's only -- really only one way you can separate it. You would have to separate it in the middle of the part. So ycu would have to cut one configuration in the top part and one in the bottom part.

Q What would the die look like? I mean, first of all, you have a two-piece die now. What would it look like if you were to describe it to the Court?

A A die for this part I would obviously start round, put half of the shape in one part, and I probably take a diameter, perhaps three-inch diameter, three-quarters of an inch thick, perhaps, cut half of this shape into one part and half of it in the other part, with a means of holding it together, locating it; probably put a pin in the middle would be the simplest thing. Since I'm going to turn it in a lathe I could bore a hole in the middle, and it would be concentric, and both halves would hatch up.

THE COURT: Would the die look like Exhibits 72 and 35, is it? Exhibits 35 and 72.

The question I am addressing to you, Mr. Barton, is would your die that you have in your mind look like either one or both of these dies. If so, why, and if not why?

THE WITNESS: I would think that's about as basic as it could -- as a die would be. Yes, I would say it would look like that.

THE COURT: And that is 72.

BY MR. SULLIVAN:

Q How about 35?

A I would say it's roughly the same thing.

Q With reference to Exhibit 35, where would you get the -- I think you said you get the dimensions for the die cavity from this drawing?

A You have to form it with a radius that would give you this -- you have a diameter here; obviously a radius would be half the diameter. You would shape the tool to that.

Q So depth of the die cavity in each part would be one-half?

A It would have to be one-half, right.

Q How about the diameter of the die cavity? Where would you get that number from?

A To start from, I would take the diameter of the

OD on the print. Now, there may be spring to this part, but you would find that out after you made one die.

Q So there might be some trial and error?

A There could be.

Q With regard to the interior configuration of the die cavity, what does that look like, and why?

A Well, the interior configuration is going to look like the cross-section and obviously have to be stopped off; otherwise, you will never form a C.

Q So you would have to put a stop in there. What is the purpose of the stop, and why is that so obvious?

A Because when that metal starts to form, it isn't going to form in this perfect sheet; it's going to sort of crumple down. Now, if it isn't stopped here, you won't get a circle, so you have to confine that metal, as it comes together, confine it and make it fit the shape.

Q Does that cause metal to back up, flow backward, when it hits a stop?

A It would cause it to fill out if there's a proper amount of metal in there, to fill the cavity. It will cause it to fill out and fit it.

Q You have already testified you would use a center pin to align the top and bottom half.

Why would you use, first of all, one pin?

Would you ever use more than one pin?

A In a nonconcentric shape, yes, you would perhaps -- an ordinary die set would have a pin here and here which would align the die. But that obviously is more costly. Now, you could also have a ring on the outside, but there wouldn't be too much sense to take either, because, since you have to put this in a lathe to turn it and since you have to chuck it up and hold it true, since you are turning this here, there could be irregularities in your chuck, and in all probability would be; so the sensible thing would be to bore the hole here, which would then be true with this.

Q Since it is a concentric shape, does it lend itself to one pin?

A Yes.

Q Why?

A Simplicity.

Q I mean the piece, when you put it together -- it does not matter which part goes where, as it does with a rectangular die, for example?

A Right.

Q I think you touched on this, but, keeping in mind what Mr. Sommer told you that he wants to use this die for, what would you make the die out of? What would the material be made out of?

A It certainly would have to be a tool steel, and I would probably use an air-hardened tool steel.

Q Why do you say it should be a tool steel and you would use an air-hardened tool steel?

A Well, it must be hardened, in the first place, and it would take a type of tool steel which is capable of being hardened. You have to have -- in order to do a job like this, you have to have a very slippery surface; therefore, it can't score, as would happen with a soft tool.

Q What are some of the air-hardened tool steels that you might use?

A You might use H&R 80, would be a 5 percent chrome; Airdye 150, a little better grade of one -- 12 percent chrome. Almost any number of --

Q Is Graph-Air one of those?

A Graph-Air is another one. 484 Carpenter's.

Q Once you made the die, you designed the die, how would you go about coming up -- well, let me back up.

If I have not said this, you are to assume for the purpose of these questions that Mr. Sommer would provide you with this hoop. Okay?

A Right.

Q Once you determined the die cavity dimensions, what would you tell Mr. Sommer about the size, the diameter of the hoop, what it should be, and what the hoop height should be, and why would you tell him that?

A You could roughly calculate the hoop height from the circumference of this circle, and I would take a point one-third out from the inside, which would be the neutral axis, and I would calculate the circumference, take out the amount of the angle that isn't involved, and that would be my starting point.

Now, after that you would have to experiment.

Q So there would be trial and error after that?

A There would be trial and error involved.

Q How about the circumference of the band? How would you get that figure and what would you tell him?

A Well, since we're going to form it with two dies coming together like this, you would want it -- and it's going to be open on this side -- I would make it just inside the major diameter, just inside the three-inch diameter.

Q In the die that you have described that you would form, this has the opening on the inside?

A Uh huh.

Q In the forming operation in the die that you have just testified about, would the interior of the metal as it was being formed be supported?

A No.

Q Would you be concerned about the lack of support, and, if so, why and what would you do?

A It's possible. I would certainly try this method, and I might pre-form.

Q Why would you pre-form if you tried it?

A By "pre-form" I mean start the curl on the edges slightly.

Q What does that accomplish?

A It would start it around -- start the circle.

Q Does that avoid wrinkling in some cases?

A It would help. It would also -- might prevent it from buckling.

Q The concept of pre-forming to prevent buckling is something you have been familiar with over the years?

A Oh, yes.

Q With regard to the die you have just testified about --

THE COURT: Did you ever make anything similar to that die, and, if so, for what purpose?

THE WITNESS: Hinge tools would be very similar, except that it wouldn't be circular.

THE COURT: What shape would they be?

THE WITNESS: The hinge would be circular.

For instance, a door hinge; a door hinge is die-formed, and some are supported and some aren't, depending on the --

THE COURT: Have you made some without a support?

THE WITNESS: Oh, yes.

THE COURT: Did you ever work with a band of that type shown to you by counsel, for any reason? I do not mean the C-ring; I mean the band.

THE WITNESS: I don't recall working with anything exactly like that, no.

THE COURT: You were asked what would happen if Mr. Sommer came in and gave you this problem, and you told us how you would solve it, but you did not tell us how long you think it might have taken you to go back to Mr. Sommer and say "This will do the job; it's been tested and I have used trial and error, and I am satisfied that this is what you want." I would ask how long a period of time you feel you would need to analyze the problem, interpret the problem and reach a solution that you would back up by your reputation.

THE WITNESS: I think to make one tool I would certainly be willing to quote the job, and that's the way we'd do it, because we're not going -- the design is going to be a few sketches and given to a toolmaker and put it in a machine, make a simple die and give it a try. Now, you might make two or three dies. But I would be quoted -- quoted perhaps in the 1500- to 2,000-dollar range, which would be two to three weeks of work.

THE COURT: You may proceed.

BY MR. SULLIVAN:

Q His Honor just asked you some questions which I was about to get into, and I have one other question in that regard:

You mention a $1500-$2,000 figure. You would have quoted it, and that quote would have included the cost of whatever design work was involved plus the cost of actually making the die; right?

A Right.

Q So, if it took you longer, that was your problem, would be your problem under that kind of quote?

With regard to the cost of that die, what happens if Mr. Sommer was satisfied with what you did and you were satisfied with what you did and you received a second order? What do you think would be the cost of a die -- make it a different size; this is a three-inch diameter; now you get one for five inches? How would you quote that, and why?

A I would think the second tool would be considerably cheaper, perhaps two to three hundred dollars -- and, again, this is a process of evolution, evolving better ones. The fifth one would be cheaper than that, probably be a hundred dollars, perhaps.

Q So it would be descending?

A But the difference in diameter would be in material mainly.

Q So, if he asked you to quote on a ten-inch die, there would be a difference in cost?

A Definitely, because you would be talking about some -- considerably more money in tool steel and in hardening, actually.

Q This particular diagram that you have in front of you -- that is a shape with the opening on the inside. How about if Mr. Sommer asked you to do the same thing for a band but the opening would be on the outside? Would the die be any different, and, if so, why?

A I think you would make the die actually just about opposite, and your band then would fit inside the contour rather than the outside.

Q So you would reposition the stops on the other side?

A Yeah. You would have to remake the die, of course.

Q But it would be the same die-forming concept would be utilized?

A Same concept except inside out, and your band would then start in the smaller diameter.

Q You have described for the Court what I believe is a concentric die.

In your work experience and involvement in this industry since 1940 have you seen concentric dies before?

A Yes. We made -- we built Bell dies with actually hand-fed dies for years, and were pretty much all concentric.

Q Can you think of any other times that you used concentric dies in your business?

A Anything round would be concentric tools.

Q And you have made round pieces over the years?

A Oh, yes.

Q How about a concentric die with a center pin? Have you ever done that to make a part?

A Yes, this would be the simplest way to do it.

Q Because you are starting with a concentric die, the center pin follows?

A Right.

Q Can you give the Court an example or two of where you used a concentric die with a center pin to align the top and bottom?

A Yes. An electrician wants to pierce out a box. Even though he's out on the job, he has a little simple die and had a little simple punch with a bolt through it, so you might want a two-inch hole, but he might drill a half-inch hole because he can't handle a two-inch drill. So he might drill a half-inch hole, put the bolt through. The bolt lines up the punch and die, and he hits by hand and knocks a hole through in a matter of minutes.

Q With respect to the die that you have in front of you, I believe you have also testified there is not any support on the interior of the forming part, and I believe that you testified that that would be the same way you would have gone about doing it.

Can you tell me whether the Barton Company has formed parts where the interior of the forming part is unsupported during forming?

A Yes.

Q Can you give me a couple of examples?

A I believe I gave you one piece.

Q Okay. Let me show you this piece.

A There's another one, a round one, a cup.

Q I will show you these pieces and ask you where they came from, first of all.

A That's a hinge for the license plate on a -- last year's Chevrolet, rear license plate. This is unsupported -- hing point is unsupported in the middle.

Q Where was that piece made?

A Made at C. Coles in New Haven. We designed and built the die.

Q How about this piece?

A This piece has a rolled edge, and it's ten-thousandths material, has a rolled edge here unsupported. It's for North & Judd Drapery Division -- Stanley Drapery Division, and that's done in Wallingford.

Q When did you design and make the dies for the hinge that you just testified about?

A When?

Q Yes, if you can give a ballpark figure.

A Roughly a year and a half ago.

Q How about this cup?

A That's all of ten years ago.

MR. SULLIVAN: I would like to offer as CO the cup that Mr. Barton just identified as coming from his company, and as CP the hinge that Mr. Barton has just identified as coming from his company.

THE COURT: Full exhibits.

Are you going to offer CN?

MR. SULLIVAN: I will offer it as a full exhibit, your Honor.

THE COURT: Very well, full exhibit, CN.

BY MR. SULLIVAN:

Q Can you think of any other part that was made at Barton Company that was unsupported?

A My dad made a wheel die for toys with that basic shape, and that was in -- somewhere previous to 1920, 1918, 1920. That type of die was one for years.

Q Was that unsupported on the interior of the forming surface?

A Unsupported, yes.

Q With regard to the stop that you testified about that would have to be cut into the die to stop the metal from forming, is that a commonly used concept in the tool and die industry, the concept of stopping metal?

A All we know is that we can't form the shape unless we fill it -- fill it out with metal; therefore, we have to stop it.

Q Can you give me an example -- have you used that concept at the Barton Company?

A Yes. We've used it on hinges where the hinge doesn't make a full circle. As a matter of fact, you do use it on a hinge when it comes around and stops against itself as the same thing.

Q Let me show you CP. This is a hinge that comes all the way around?

A That stops against itself, but if the -- if the requirement were that it didn't go all the way around, then you would have to put a stop in it.

Q Have you done that at the Barton Company?

A Yes.

Q Now let me ask you the same -- Mr. Sommer again comes in and sees you in the spring of 1973, and he shows you this piece, which is a flat washer --

MR. SULLIVAN: Maybe I ought to mark these pieces, your Honor. I did not intend to use it, but maybe I ought to mark them since I am going to use them.

THE COURT: CQ.

MR. SULLIVAN: CQ, the band that Mr.

Barton testified about in connection with CN and his opinion as to the type of die he would design; and as CR the sample metal C-ring that I told him Mr. Sommer would bring to him.

Now let me have marked for identification, before I get into it, a flat washer, which I would like to have marked as CS, and as CT a sample axial seal.

THE COURT: Before we get off the C-seals, Mr. Barton, can you think of any circumstances or any dimensions or any facts that Mr. Sommer might add to that hypothetical you were given that would cause you to express an opinion that a die should not be used and some other process should be used? For example, did anyone ever come into your shop and say "I would like a die to do this job," and you looked at the job and you said "Don't use a die, use a roller or use some other thing"? Does that ever happen?

THE WITNESS: Very often, yes.

THE COURT: Can you think of any circumstances that would have to be added to the hypothetical you were given that would cause you to express an opinion that a die really is not the most feasible way of making that product?

THE WITNESS: Yeah. I think probably -- I think more in terms of dies than anyone -- than most people -- because this is the thing -- the one means I would be familiar with. I'd be familiar with producing this tool by a die. If I knew of a better method, I'd certainly tell the customer.

THE COURT: I mean what if he said he wanted a 25-inch C-seal in diameter? Would you say, "Okay, I'll make you the appropriate die"?

THE WITNESS: At that point it might be possible to make it from rollers. It got that big, I'd certainly do some thinking about it.

THE COURT: Would you reach a point if you knew he was making O-rings to say "Why don't you use a machine and machine out the O-rin and make it a C-ring"? Do you think you might say that?

THE WITNESS: I think it would take longer to machine it out than it would to make the tool to make it with.

BY MR. SULLIVAN:

Q Now let me show you what has been marked as CS, which is a flat washer, and what has been marked for identification as CT, which is a C-ring with the opening on the top. In this litigation we have referred to this as an axial C-ring.

I ask you again, if Mr. Sommer came in to you in the spring of 1973 and showed you that piece, the flat washer, and said "I want to form that into this axial seal," and he again told you that initially low volume, ten to five hundred pieces, but he hoped for future orders, and he wanted an inexpensive, durable die, and would be making these in varying diameters, the ring, do you have an opinion, based on reasonable probability, whether you could have filled such an order for Mr. Sommer in the spring of 1973.

A Yes.

Q Can you describe for the Court what kind of die you would have designed to form that washer into that shape?

A First, U it up, the section, into a U-shape, with a radius on the bottom, two straight sides. Then come down over it with a curling tool with my stops in it and with a -- lay it into a radius on the bottom and the curling tool on the top, and come down on it to complete the shape.

Q The die that you have just designed -- would that have more than one stage in the forming process? I mean would you use more than one die, and, if so, why?

A Yes, I would certainly want more than one die. I'd want to U it up first.

Q So you would have more than one die. Do you know how many forming dies you would use, and, if so, why?

A I would probably U it up first and then come down over the top of it and cup it, and possibly a pre-form ahead of the U-up.

Q So it would be possibly a three-stage die, a pre-form, you would U it up, and then you would nose it over; is that correct?

A Right.

Q So you would have three dies.

Can you tell me why, when faced with the forming of the axial, would you use in that situation three dies as opposed to one?

A I think it's the simplest way to get it.

Q Why is that? Explain to his Honor why that is your opinion.

A Well, it's quite simple to take that part and U it up one on the inside and one on the outside. What we'd be doing is forming this into a U-shape first, then come down and curling it back. I think that would be the simplest way to do it.

Q Can you tell his Honor how long, in your opinion, it would take you to design and make those dies to form that axial?

A I would think it would take longer than the other one, probably three weeks; maybe 2,000, 2500.

Q Once you made the first dies to form the axial, if you received a repeat order, would the charge for that second die be any less than the initial die?

A Yes, it would be less, but there would still be three -- two to three operations in there, so it's going to cost more.

Q What would it cost you, approximately, after you got three or four orders for dies like that? What could he buy them for?

A Oh, perhaps three to four hundred dollars.

Q Has your company had experience in forming Inconel as a metal?

A Yes.

Q Has your company also had experience in forming welded strip?

A Matter of fact, we're doing that now on a production basis.

Q So the fact that you are going to use Inconel and welded strip would not be unfamiliar to you if you were asked to do that?

With respect to the things that you have talked about here today, in your opinion are any of the die-forming concepts that you have testified about a trade secret, confidential information to your company?

A No, that's pretty much common knowledge.

Q In the die industry?

A Right.

MR. SULLIVAN: I have nothing further except to offer S and T as full exhibits.

THE COURT: Full exhibits.

Cross-examination.

MR. KELLY: Can we look at S and T?

MR. SULLIVAN: Oh, I am sorry.

Is there any objection to those, now that you have viewed S and T?

MR. KELLY: No.

CROSS-EXAMINATION

BY MR. KELLY:

Q Mr. Barton, you are aware, are you not, that there is a protective order that has been entered in this lawsuit and that the matters that you have learned about forming are not supposed to be discussed outside of the court?

A Not really, no.

Q Wasn't this brought to your attention by Mr. Sullivan at some point?

A It may have but -- yeah, it may have.

Q I want to call that to your attention at the moment, sir.

Can you tell me when was the first time someone from the Advanced Products Company contacted you with reference to giving testimony or consulting matters pertaining to this lawsuit?

A I would think probably three months ago.

Q Three months ago?

A That would be my guess, yeah.

Q Was there any earlier contact you had?

A No, not much different than that.

Q You think around January of 1975 was the first contact you had?

A I would say so, yes.

Q Do you recall who contacted you from the Advanced Products Company?

A Yes. Mr. Sommers.

Q Have you known Mr. Sommer for long?

A No. My first meeting.

Q Do you know how he came to contact you?

A Yes. It was through a -- through a customer.

Q Was this a common customer of yours and Mr. Sommer's?

A I don't know that. He was my customer.

Q I see.

A Perhaps only a friend.

Q Who was the customer; do you know?

A C. Coles & Company, New Haven.

Q So Mr. Sommer, then, if I understand correctly, told you that he had been referred to you through C. Coles?

A Yes.

Q This was around January of 1975?

A I could be wrong by a month or two, but it was about then.

Q Subsequent to this conversation, did you have some meetings with Mr. Sommer to discuss matters in the lawsuit?

A es.

Q How many times did you meet?

A I think -- we met him once back then. Then it was pretty much forgotten about for a couple of months, and I would say once about a week and a half ago, and again this morning.

Q Had you been out to the Advanced Products plant?

A No, I never have.

Q Whom else did you meet with aside from Mr. Sommer?

A Mr. Sullivan.

Q Only those two gentlemen?

A Only those two.

Q Mr. Barton, does your company manufacture or assemble something called the Harper buffing machine?

A Yes, it does.

Q What part of your business does that comprise?

A Oh, 20 -- 20 percent perhaps.

Q Can you state generally what the Harper buffing machines are?

A We have two type of buffing machine. One is an automatic buffing machine for doing high production parts such as automotive bumpers, things like that; and they also have tumbling equipment.

Q What types of concerns are likely to use the tumblers and the buffers?

A Almost anything that has to be polished. Automotive uses a lot, several plants right here in Connecticut.

Q You said in your testimony that you had worked with Inconel alloys; is that correct?

A Uh huh.

Q And you also had worked with forming a welded band?

A Right.

Q You said that one of those you were using in production now. Could you describe what that is?

A Welded band is tubing.

Q Please?

A A welded band is tubing, becomes tubing. Most tubing --

Q I want to clarify this now.

I have here Plaintiff's Exhibit 29, and this is what we have been referring to generally in the trial as a welded band.

A Right. That's tubing.

Q Okay.

A Okay.

Q You have used a band similar to this?

A I've used a welded band, which would be thicker and perhaps larger, or not necessarily larger but somewhat thicker.

Q How much thicker, do you think?

A Could vary from -- from that to a quarter of an inch. We've handled quite a lot of it.

Q How about the length and the height of the band?

A Anything up to two feet, from very short up to two feet.

Q By "very short" what do you estimate?

A Shortest I can think of right now would perhaps be an inch and a half.

Q So, then, the bands you have reference to, it would be fair to say, would range in general from an inch and a half to two feet?

A Could. Could be, yes.

Q From thickness, minimum, up to what?

A Oh, up to hundred and fifty, two hundred thousandths.

Q What would be a minimum that you can recall having worked with?

A Oh, quite thin, certainly 25 to 30 thousandths.

Q With respect to these bands, were these Inconel bands?

A No, just regular steel.

Q Stainless, was it?

A Both stainless and the regular.

Q With respect to Inconel, what can you recall that you used Inconel for to form?

A Use Inconel from the old Guided Radio Corporation for telephone parts, some ten, eleven years ago, and I don't think I've used it a lot since, but we formed parts from --

Q Have you ever made a metallic seal from Inconel?

A Not that I know of.

Q Please?

A Not that I know of.

Q With reference to the welded strip, is this what you referred to when you said you have some in production now or you are using it in one of your production processes now?

A Right.

Q What --

A Tubing, tubing, steel tubing.

Q What is being made from this tubing?

A At the moment it's a very small container for gas, controlling a heat-seeking missile. It's a container to hold 7,000 pounds of gas.

Q Did you say part of a control mechanism?

A Right.

Q And it holds gas?

A Holds the gas that does the controlling on a heat-seeking missile.

Q How large is this component?

A Two-inch diameter by three and a quarter length.

Q And both ends are sealed somehow?

A Both ends are sealed.

Q What we are talking about is a small cylinder; are we?

A Right.

Q Do you do the welding?

A On that we don't. That's electron beam welding.

Q Do you subcontract that out?

A We sub that out.

Q Mr. Sullivan asked you some questions about tolerances, and I believe you said that you have worked with tolerances of one to two-thousandths and in some cases tolerance expressed in a tenth of a thousandth; is that correct?

A Right.

Q Do you recall what types of parts these dies were designed for?

A Oh, many of the small watch parts -- it could be watch parts or small brass parts for the eyelet industry, Scovil particularly.

Q Please?

A Scovil Manufacturing Company, very small, little eyelets of 65, 66 thousandths total.

Q Do you know what is likely to be the production run on these types of parts?

A Those were extremely high, like five or six pieces in one die, which might be 40,000 an hour.

Q 40,000 an hour?

A Could be, yes.

Q This is designed to run on a more or less continuous basis?

A That one was, yeah.

Q You referred to watch parts also.

Do you have in mind a particular part?

A Not really. There have been a few Timex parts.

Q What do they look like; do you know?

A Could be almost anything, little washers.

Q Did not involve forming necessarily?

A Yes, in cases.

Q You mentioned a washer. I assume that is a flat disc?

A No, it can be formed, could be formed. Depends on the part.

Q I am trying to ask what you recall with reference to your close tolerance work, and you mentioned a washer. Do you recall what the washer was?

A Not really. There have been two or three parts, but I don't think I've made anything in ten years.

Q That was sometime ago.

Is it possible for you to characterize your die-making business by saying, you know, "The bulk of our business is in progressive dies" or, you know, "The bulk is in special dies"? If you were asked to characterize it, how would you state that?

A I would say that the bulk of our business is now in progressive dies, but I would have to say that this is the evolution in the industry, because years back everything was hand-fed.

Q I realize there can be quite a difference in size in progressive dies, you know, depending on what the application is going to be; but is it possible for you to express a range in prices or, you know, some of the standard types of uses for which a customer might order progressive dies to be designed and fabricated by you?

A Oh, yes. Well, a die for that part consists of eight or nine stages.

Q Okay. Just so we are clear, we are referring to --

A That particular part.

Q This is Exhibit CP.

A That's about a $12,000 tool.

Q I believe you testified that this is part of the mounting fixture for a license plate on a Chevrolet?

A Right.

Q And the die for this particular piece would run about $12,000?

A That's right. It would be about -- close to 60 feet long.

Q What is the volume that this die would be used for?

A Volume? Three to four thousand pieces an hour.

Q This would be essentially to fill all the Chevrolet requirements?

A Supposedly half of them.

Q Now let me ask you this about the conduct of your business:

When a customer comments to you and gives you a design for a die, you design the die, then normally does the customer take the die back to his plant or do you do the production work at your plant after you have designed the die?

A No, we don't do the production work.

Q Then you customarily design the die, sell him the die?

A We do enough production to prove the tool, normally.

Q Yes; you do some testing on the die to insure to your satisfaction that it would meet his requirements?

A Right.

Q You said $12,000 approximately or roughly for the die used to produce Exhibit CP.

Does it range upward from there, your cost of progressive dies?

A That is an expensive one.

Q Is there -- and there may not be -- an average cost on a progressive die?

A No. It would be awfully hard to get it, because -- it depends upon the complexity of the part, a lot of things.

Q What would you consider a big order by way of cost? If I came in to you and said "I want a progressive die" and you tell me it is going to cost so much, in your mind what would you consider a large cost for a progressive die?

A That's a hard one. Our dies would range from anywhere from a couple hundred dollars to 25,000. We've had tools up to 25,000.

Q Is there a difference in your mind between an embossing die and a matched metal die?

A Yeah. An embossing die would contact the -- I don't know -- matched metal -- I suppose they'd be the same thing, really.

Q Have you heard the term "matched metal die"?

A Not really, not as such, no.

Q What do you think of when you hear the term "embossing die"?

A An embossing die would be one that would actually come down and hit metal to metal and actually form a shape into something.

Q It would be sort of a stamping operation?

A I would say so, yes.

Q How much of your work would you say is done for the automotive industry?

MR. SULLIVAN: Your Honor, I think it would be helpful if he would put a time period around this. If it is present, he can say it.

THE COURT: Why don't you break it down to time periods.

THE WITNESS: May I say that --

A Very little this year and last year perhaps 30 percent.

Q Has your 20 percent estimate of Harper buffing been constant throughout the period?

A Fortunately it's a little higher right now. Automotive is dropping off.

Q Then talking in terms of the past year or so --

A I would think Harper'd be 20 percent, automotive might have been 30, various other dies another 20 or 30 percent.

Q I am going to ask you a few questions about the hypothetical question that Mr. Sullivan asked you.

I believe you stated that with the first die you were asked to design that you would be willing to quote the job and that you would think possibly two to three weeks, 1500 to 2,000 dollars; is that correct?

A Right.

Q Have you ever been asked to quote a similar job that you can recall, to the one referred to in this hypothetical question?

MR. SULLIVAN: I object.

A With that exact shape, I would say no.

THE COURT: The objection would have been overruled.

MR. SULLIVAN: Okay, I am sorry.

THE COURT: In case it comes up again, Mr. Barton, if you hear Mr. Sullivan say anything before you answer, would you hold up your answer and give me a chance to rule.

All right, go ahead, Mr. Kelly.

BY MR. KELLY:

Q Do you have the question in mind?

THE COURT: He said "No."

A The exact shape, no.

Q Have you been asked and have you actually designed dies for static metallic seal?

A Not really, no.

Q Have you attempted to do so?

A No.

THE COURT: I do not understand what that term means, "static." Is that the first time I have heard that, Mr. Kelly?

MR. KELLY: It may have been used before.

What I am talking about is sort of a generic term for O-rings, C-seals, the seals that are locked in place.

THE COURT: All right.

You have not been involved in the O-ring or the C-ring or the axial rings or V-rings business at all?

THE WITNESS: No.

THE COURT: All right, go ahead.

Q I believe you testified that after a while, you made some of these dies, your tooling cost would come down;

then it would be more a function after a while of how big the die was and how much tooling steel you needed; is that correct?

A Right.

Q Is it possible for you to give an opinion as to what the ultimate cost of making a die like that would be? Say you look at the die now and you know how to do it. How much time and cost do you think it would take to make one now?

A There are a lot of things enter into this. How many tools? If you are talking -- if you wanted fifty tools of different sizes and I can set up that shape and plunge right into it, you might make one in three or four hours.

Q What would you charge for that?

A Might come out for less than a hundred dollars.

Q Suppose --

A But this depends again on size.

Q Suppose I came to you and said this: "I can't tell you at this time all the different sizes I need; I just know that over the next year or two I'm going to need a lot of different sizes; there may be several hundred different sizes; some of my orders are just going to be for ten parts or, you know, maybe thirty parts, fifty parts, on that order; can you help me out," what would your response be and what would you think in terms of the economics of this?

A Without seeing the print for the specific tool, no, I can't pass judgment on it. I don't know what particular shape or size you are talking about.

Q Just so I am clear on this, if I came to you and I had Exhibit CN and I said, "Mr. Barton, this is really the only thing I'm sure of at this minute; I expect over the next year that I'm going to have a number of other diameters of these seals; it's going to be the same cross-section design, but the heights of the seal and the diameters are going to be different and there maybe a hundred or there may be two hundred caryimg diameters and varying heights of the seal; also, some of my production using some of these dies may only be for an order of twenty pieces or, you know, forty pieces; some of it might be higher," can you give me a price estimate on the initial die and also do you have any way of estimating what the cost might be on subsequent dies?

A Well, you said a same cross-section but of varying heights. Now, that can't be. If this is the cross-section, then we use the same tool.

Q I misspoke. I mean the same configuration.

A All right, but different diameters -- using different diameters.

Q A different diameter of the seal, and the height of the seal would be different. There may be a couple hundred different variations.

With this in mind, could you give me an estimate as to how much the initial die might cost, and is it possible for you to give me an estimate on how much subsequent dies might cost?

A Again you are giving me a diameter. What diameter range?

Q Let's assume that the diameter range is going to be from eight-tenths of an inch up to six inches for the purpose of this question. There may be numerous, you know, within that range.

A I would think the most expensive part of that job would be the forming of the tool to form the cavity. We'd have to form a cavity for the configuration. What we'd have to do would be to form a tool to form the cavity, and depending on the number of configurations or the number of sizes of this configuration, then we would have to form a tool for each cavity. That might be more expensive than the tool.

I would think it might be talking hundred, hundred and fifty dollars to form the tool. Then, after the tool was formed, I think we could make the parts -- then you would be talking about tool steel hardened.

Now, when you get into something around six to eight inch, you may also be talking about grounding, because you might get some deformation. In the small sizes I would say you don't.

Q Is this not precise enough for you to give an estimate on cost, you know, just the facts that I have stated? Would you be reluctant to give an estimate on costs, to give a firm quote?

A I think that I would give a quote, and my original quote would be a guesstimate in it with money in it to spare to pay for my experimentation in developing something. Then I think the time for me to quote would be after I had made one or two, to give a sensible quote on a few hundred pieces.

Q You say a quote on a few hundred pieces?

A A few hundred tools.

Q A few hundred different dies?

A Right, or even -- I qouldn't quite any quantity of dies until I had done my experimental work and known exactly what it was.

Q Would you think that you would require some experimentation on each size?

A I don't think there'd be much on one -- after one size, after one was done.

Q The major problem would be on the first?

A Right.

Q Let me ask you this, again with refernece to the hypothetical question that Mr. Sullivan asked you:

When he was referring to an internally pressurized C-seal, I believe, initially, the type that is shown in Exhibit CN, the first question which he asked you, here is Exhibit CR as a representative example of the seal, itself. Who in your company would actually take this problem and sit down? Would that be yourself, possibly?

A In all probability it would be myself.

Q I believe you testified that you would attempt to develop a simple die such as Exhibit 72 as the solution to this problem, is that correct, a die like this?

A Right.

Q Suppose for the purpose of this question that you ran into a problem, you tried to develop that die and you ran into a problem; as the metal formed over, you started to get wrinkling or buckling, and, you know, you had a lot of problem with crumbling of the bands that Mr. Sommer had provided you with.

What are some of your thoughts on what you might do to overcome that particular problem?

A Well, I might even pre-form to -- if it started to curl over on either edge.

Q Suppose you tried pre-forming and you still were not satisfied, you were still getting buckling or wrinkling after a pre-forming operation.

Can you think of anything else you might do?

A There isn't really -- probably alter the shapes to some extent, possibly come in with another operation. I don't think of anything right now.

Q If you did have this buckling and you pre-formed and you still had buckling, what would be your opinion as to the cause of this continued buckling?

A Well, naturally, you are shrinking the metal from-- as you go in, and that would be the cause of it, would be the fact that the metal's rhinking. You would probably alter shape or something and perhaps vary the diameter of the blank.

Q So a reason might be that you had an incorrect diameter on the hoop you were using?

A You might have to vary a little, I would guess. I would expect to have to vary it both in thickness and in diameter.

Q By "in thickness" you mean in height?

A In height and diameter, right.

Q With respect to wrinkling -- and I am making a distinction here between buckling, you know, short of crushing, and wrinkling, when I say "wrinkling" -- when the C starts to come over --

A Right.

Q -- instead of going into a nice shape along the cavity dimension, you know, it bends in and you get an imperfect C -- just considering wrinkling now, if we can agree we will call that wrinkling where we get a malformed C -- what do you think you might do to try to overcome this problem?

A I think I'd do a nice smoothing job on the dies, make the die as smooth as I could.

Q If you still had the problem of wrinkling after you had pre-formed and you have done as good a job of machining and smoothing the die as possible --

A I might use more pre-form.

Q -- might you consider some sort of hydraulic forming in this instance?

A I can't believe it in anything that small.

Q How about rubber press?

A There's nothing in there. You couldn't do anything with it. There's nothing on the inside, no room in there.

Q I assume from that there would be a problem in --

A I can't see it in something big.

Q In other words, if there was a C configuration but -- how big would you say before you would think rubber press would be feasible?

A I don't really know, but I can see it if you are talking about something fairly large.

Q Six inches in reference to the opening of the C? I am just trying to understand what you mean by "fairly large."

A I wouldn't think it would be practical to put rubber into any less than an inch. It would probably have to be inch -- larger than an inch.

Q When you say "an inch," are you referring to the opening of the C cavity?

A Cross-section.

Q I assume one problem you would have would be refracting, withdrawing the rubber from within that C cavity?

A I would expect that would be a problem, yes.

Q Now a couple of questions on the axial seal which Mr. Sullivan questioned you on. Here is Exhibit CT, so we will be sure what we are talking about here.

Would you state again, Mr. Barton, if you were asked to design a die for the axial seal, what sort of die would you envision? What sort of forming operation would you envision?

A I'm assuming you are talking about this particular size of seal.

Q I was not necessarily; but does that make a difference in your answer--

A Yes.

Q -- which size we are talking about?

A If we're turning that edge up, we have to turn that edge up a half an inch, we're going to work entirely different. But if we're turning it up the length of this, this would be entirely different way of going.

Supposing I had a -- if I had a half of five-eighths section to this, I would have to work entirely differently.

Q Would you still be using die forming then, or might you --

A I'd still be using die forming, but it would be different.

Q Was your answer to Mr. Sullivan's question concerned with that size axial seal, which is demonstrated in Exhibit CT?

A Yes.

Q If we assume that that is the size we are talking about, that is the configuration we want, would you just state again so it is clear in my mind what you would envision as the die-forming technique that you might evolve?

A Well, naturally, it would be a round die. I would form that up into the shape of a U first.

Q Would this be a sort of pre-form operation, this initial U?

A Yeah, bring this right up in a U with a radius bottom so you would have two straight sides on it. In other words, the section would be U-shaped. Then the next thing we're going to do is come down with a die and form that.

Now, we might need a pre-form ahead of the U, depending on the --

Q How many stages would you envision in this process?

A I would try two. I might need a pre-form ahead of the U.

Q So you would try two stages initially but you could see possibly using three?

A Yes.

Q Let me show you a drawing which has been marked as Exhibit AO; and I am just inviting your attention to the right-hand segment of this drawing. You see there depicted some dies, the die-forming operation, and it is headed "Die Forming An Axial Seal."

Is the depiction on Exhibit AO in the right-hand corner similar to what you had in mind when you were talking about die-forming an axial seal?

A That isn't what I had in mind, no.

Q How does what you had in mind differ from what is shown there?

A It would merely be the approach. I would have U'd it straight up and then formed it over.

Q You would have a step in here where you had the edges of this work piece going straight up from the bottom?

A I would have started, and my original idea would have been to start here, with this straight up, and that come down and curl it over.

Q Two steps?

A Right.

Q But, with that difference, this would be generally similar to what you would have had in mind?

A Generally similar, right.

Q Mr. Barton, I have in my hand a die which is marked Plaintiff's Exhibit 47. What I would like you to do is just take a minute and open it up and look at it and see if you can identify it, or tell what you think it might be used to form.

A It might be a little bit hard to get it apart. I didn't bring my hammer. I assume that slips out of there.

Q You have not seen this before; have you?

A No.

Q Just take your time. If you are not sure --

MR. SULLIVAN: Your Honor, I do not know that the witness can get the die all apart.

THE WITNESS: It's not necessary.

THE COURT: If he cannot do it, I do not know of anyone in this room who can.

THE WITNESS: It's not necessary.

A It would take a straight piece in here, a washer, and would undoubtedly be centered on that, center area. This outside I would assume would be a pressure ring which would hold the outside the hold the wrinkling out of it, and this center part would be the form which would go down into it. It would form it in one -- down in one shot.

I don't quite see how it's getting around.

Q Mr. Barton, do you think that might be used to form an axial seal similar to the one that is before you?

A Probably does, but I don't think it will form it complete. I think there must be another operation. Curl it over.

Q But your opinion was that there would be another operation, other than putting a hoop in that die and compressing it?

A I would think so, yes.

Q Do you think, in general, that if you used a die like this to form an axial seal it would be simpler than using a multistage operation, using a die like Exhibit 47?

A I think it depends on how close you've got to be to the print. I don't believe you can conform to the print exactly with that tool.

Q When you say --

A I don't say whether you conform exactly or whether you can get a precise shape with that tool. Now, how close you have to be to a symmetrical shape I don't know -- or to a perfect circle.

Q Let's assume for the purpose of the question that the die process which is depicted in the right-hand column of Exhibit AO and the die exhibit, 47 -- let's assume that each of these different methods will produce a seal which is acceptable, in your opinion.

Which of the two would be simpler, more economical?

A I would think, since that appears to be having to be taken apart, that particular method there -- I think you would probably be easier to go one, two, three stages, or at least a couple of stages. The other method I think would be better.

Q Would you think the tooling costs would be greater for one than the other?

A I don't think it would make that much difference.

Q I am just going to make a sketch of two cross-sections.

I believe Mr. Sullivan asked you questions about a seal which would have the C facing toward the outside; do you recall that?

A Right.

Q The first question had to do with a seal, the open portion of the C facing toward the inside. That would be the center line there. We are talking here about the outer diameter of the seal.

Did you say earlier that if you had to design a die for the exterior for the seal shown in the lower portion with the opening toward the exterior you think you would use the same concept, but the die would be just reversed?

A I would think so, yes.

Q Do you know with respect to each of those two configurations, the seal with the C facing toward the interior and the seal with the C opening facing toward the exterior, whether the metal flow characteristics would be the same in each case as you formed that shape?

A Basically I would expect to be stretching on the lower one and contracting on the upper one. I would expect the metal at the outer edge of the lower one to be thinner.

Q Would it be true that, where you were contracting, the metal would be in compression?

A Right.

Q And where you were stretching it would be in tension?

And might not this present different problems in forming?

A I wouldn't expect any problem unless it begun to tear, unless it got thin enough to tear. The lower one you are talking about?

Q Unless the lower --

A On this lower one, I wouldn't expect any problem unless the metal began to tear.

Q Why might it begin to tear?

A If you stretched it beyond its limits, which I wouldn't expect in that case.

Q In order to avoid stretching beyond its limit, this would be the purpose of the stop in the die; would it?

A I don't know that it would be beyond its limit.

If it were, you might have to pre-form.

Q If it did begin to stretch beyond its limit and to tear, might it not also indicate that the height of the hoop was incorrect or that some dimension associated with the hoop height was incorrect?

A Very well could, yes.

Q Getting back for a moment to the first die that Mr. Sullivan asked you about in the hypothetical question, I believe you said 1500, 2,000 dollars, in that range, to producé the first die, and then you were talking about the cost going down as you produced subsequent dies.

So I am clear, in these cases we are still talking about Mr. Sommer providing you with the band; is that not correct?

A Right.

Q Your estimates and your costs here did not include the J. C. Barton Company's fabricating these bands; is that true?

A Correct.

Q You said, again with reference to the initial hypothetical question, involving the first die, your estimate was two to three weeks; was it?

A Yes.

Q And some of this time would be trial and error while you were trying to obtain the configuration, the dimensions that would give you an acceptable product; is that correct?

A Right.

Q In subsequent dies that you got -- assume you got subsequent orders -- you would also have some component of trial and error work before arriving at your satisfactory solution?

A I wouldn't expect after we -- after you had made three or four, I would expect you would have worked out some sort of formula so you didn't have to experiment very much.

Q You think there might be some sort of a constant relationship that you could get, you know, with reference to the band and the die cavity, so after you had done several it would be much easier?

A I would expect it would be easier, yes.

Q I have Exhibit CO here, Mr. Barton. I did not get this the first time you said it. Did you describe what this is used for?

A It's an end plug on a container for curtain rods, paper container for curtain rods.

Q This keeps them from falling out of the carton?

A Right.

Q This was produced by your company --

A Yeah.

Q -- the die for this?

A Yeah.

Q Do you know how much the tooling cost? Do you have an idea?

A In the order of $5500. That's producing about 4,000 pieces an hour in one operation.

Q Would you refer to this as a high-speed die?

A Not really high speed. It's normal production.

Q That was 4,000 pieces?

A About 4,000 an hour, automatically fed.

Q Do you know when this die was designed, the die that produced this part?

A Approximately ten years ago. We've built three or four since.

Q Your price of $5500 would be as of ten years ago?

A I would guess.

Q I assume your prices have gone up within the past ten years?

A There's a few things in here that's -- that's a carbide tool for -- for some reason it also has a hydraulic arrangement in there that produces that in one shot. It's not a common die. It's a quite complicated tool.

Q This was designed for durability, for long, useful life?

A Right.

Q The die to make this exhibit --

A The part is basic. The thing what we had to meet there is that we're producing that in one shot instead of two or three operations.

Q You said something that I did not get completely in your direct testimony, about your father having made a wheel die in around 1918.

A This is a toy.

Q Please?

A Something around four or five inch, for a toy.

Q For a toy?

A A toy wheel.

Q You mean, for example, a truck that a child might have?

A Right.

Q This die would produce a wheel to go on that truck?

A Right, steel wheel.

Q This was in 1918, did you say?

A About that, yeah, probably 1919, 1920, somewhere in there.

Q How old are you, Mr. Barton?

A About 59.

Q So you were not active in the business?

A Not really, no.

Q Just one other question, Mr. Barton:

There were some questions from Mr. Sullivan with respect to the use of a center pin in the dies --

A Uh huh.

Q -- and I believe you said that you had used a center pin before?

A Oh, yeah, I think -- it's a common thing.

Q Would you have used a center pine in a chassis punch that you can think of?

A You talking about the electrical box that I spoke of?

Q Are you familiar with a Greenley chassis punch?

A Yes.

Q Would you have used a center pin in that operation?

A Are you talking about the punch -- yeah. That uses a center pin, used a --

Q Is this something that you manufactured or used?

A No. It's a very common thing.

Q Could you just describe once more what you recall that you have used a center pin in for alignment purposes?

A Almost any -- any type of forming where you wanted a quick forming job. There's no simpler way to get it. You set up in -- set up in your lathe, and if you want it true, since your chuck normally isn't true and the only way you get it true is to bore a hole in the center, therefore you put a pin in it.

Q Are most of the dies that are in your company mounted on die shoes?

A Most dies are normally mounted on die shoes, yes.

Q In these die shoes you may have one or several alignment pins?

A There would normally be two.

Q Just one final question on this question of the center pin, Mr. Barton:

What was it that you personally remember using the center pin on for alignment purposes in a die?

A We formed a temporary foot ring here, a few -- perhaps two years ago, a temporary foot ring for one of our cups, and did a similar thing of this, although not the shape. It was just a sort of almost a bell sheet and the foot ring in one of our cylinders. And the simplest way to do it was to do it with a pin, two matching forms, and threw 'em down and set a blank over it, which we developed a blank out much the same as you would.

Q With reference to Exhibit CP, which is this part of a license plate mounting bracket, I guess, this is a die-formed part?

A Right.

Q Is that one-stage operation?

A No, that's more like eight or nine stages.

Q Would this be formed on a progressive die?

A Progressive tool, right.

Q Did you state what the cost of the tooling was for this?

A Yes, about 12,000.

Q What type of forming operation is used to get these two circular projections here on the piece?

A They're formed first up, then cammed in the position that you have it. It would be camming in, and when I cam in I pre-form the end of the curl, the end of the hinge. Now it's got a little form at the top, straight and formed in. Then we come down on it straight. Again we cam form in from the other side to provide support underneath it, would be the next stage, and the cam right down which develops that curl. It forms against itself and rounds out.

Q So, if I understand correctly, with Exhibit CP, reference to the curled portion here, it is a several-stage forming operation; correct?

A Yes. It's one, two -- two curls -- two forms on the curl.

Q And at some point in that forming there is some means of providing internal support?

A No.

Q All right. Maybe I misunderstood that portion of your testimony. Would you describe --

A There's internal support on the first shot, yes.

Q There is internal support in the first stage of forming?

A Right.

Q And then the last stage is bringing the curl around till it meets itself?

A Right.

Q And the purpose of this internal support on the first stage of the forming, I assume, is to get proper guidance on the shape you want?

A It's to get -- it's to get it stood up in the air with the proper relationship with the hole to the bottom. Then we come underneath it and form the support, and the actual curl is formed by the outside punch coming down.

MR. KELLY: We have no further questions, your Honor.

THE COURT: Redirect?

MR. SULLIVAN: Yes, just two questions.

REDIRECT EXAMINATION

BY MR. SULLIVAN:

Q In that last series of questions by Mr. Kelly he asked you about the hinge.

When you form the curl, when you get to form the curl, there is no support on the interior of that forming part; right?

A There is no support when we form the curl.

Q Mr. Kelly asked you when is the first time you spoke to me, and you said January of 1975.

Do you recall that you spoke to me quite a while before that in connection with testifying at a motion for a preliminary injunction?

A I don't know -- I can't tell you when it was.

Q That would be three months ago, the first time I spoke to you, was January of this year. You recall it might have been quite a bit before that?

A I really don't know.

MR. SULLIVAN: Okay, I have nothing further.

THE COURT: Let me ask you this, Mr.

Barton:

Have you had the occasion to make a die for people who ask you not to reveal what they have asked you to do to anyone else?

THE WITNESS: Oh, yes, quite often.

THE COURT: Is that rather common in the die business?

THE WITNESS: Yes, it's common in toys and things like where it's highly competitive. And, of course, that's standard practice on many of your military --

THE COURT: If Mr. Sommer, to follow through on this hypothetical, had come to you and said, "Look, this is what I want," and you sat down -- and I suppose there is a little exchange of ideas --

THE WITNESS: Right.

THE COURT: -- because, after all, he is an engineer --

THE WITNESS: Right.

THE COURT: -- and trained --

THE WITNESS: Right.

THE COURT: -- and at the conclusion of it you said "Yeah, I think I can produce what you want," and he said to you, "Now, after you do this, I don't want anyone to know about it; if some other competitor of mine comes in and says 'Here you are making dies for Sommer, who is making C-seals, and I am making C-seals; will you make the same die'"-- Mr. Sommer said to you "If that should happen, would you honor a confidence on this?" what would you have answered?

THE WITNESS: I've lost customers on this very same thing.

THE COURT: Because you said what?

THE WITNESS: Because I designed and built a die for one customer and somebody else came to me and asked me to do it. The customer was Mark & Buckle; the people that came and wanted me to do it were North & Judd; "Build me a die like you built for him." I lost a customer for not doing it.

THE COURT: You said no?

THE WITNESS: Right.

THE COURT: To die it down to this particular die that we are talking about here, if Mr. Sommer did say "Would you honor this confidence, you would say "Yes, of course"; is that what you are telling me?

THE WITNESS: If he asked me to do it, right.

THE COURT: Now may I ask you this, Mr. Barton:

Would you be doing it to humor him or would you be doing it because you could see that there was a basis for his concern? Which would it be?

THE WITNESS: I think it would -- if it were something of general -- general interest, something that many people were interested in or some specific customer was interested in, and he were willing to pay me my price and perhaps some more, then I would -- and I agreed to do it for-- oh, for a period of time, not divulge for a period of time, perhaps a year, two years, three years, then I would stick by my agreement.

THE COURT: All right. Take this very item that we are talking about now. We are not talking about some other item; we are talking about this very process. And he said to you, "Mr. Barton, before you even start this job, the results of it I wish to have as a trade secret and I want your confidence on that." Do I gather you would say under circumstances the answer would be "Yes, you can rest assured that I will protect this in my plant from other people," and there are some conditions when you would say "No, I cannot promise you that"? Is that what you are telling me, or have I misunderstood?

THE WITNESS: No, I think there would be no reason, since I wouldn't know of another customer, anyway, and if he -- he came and paid me for the development, I would expect that was his confidence if he asked for it.

THE COURT: And if he went further, say, he was pretty concerned about this, and said "Well, what will you do to protect me on this; how do I know one of your employees won't put one of these dies in his pocket or go down and see some of my competitors and, for a price, we will say, reveal how I'm doing it; is there some protection you can give me on this" --

THE WITNESS: I wouldn't know of any.

THE COURT: You do not hold your people under any type of a confidential relationship --

and by "your people" I mean your employees?

THE WITNESS: No. We've never had the problem, I'm sure.

THE COURT: How about some of the government contracts you get? Aren't they kind of tight security?

THE WITNESS: Yeah, many are.

THE COURT: How do you handle that?

THE WITNESS: We've never had the problem. We've never been -- we've been investigated, we've been -- we've had all kinds of investigations as far as security and this type of thing, but it's never come up.

THE COURT: So let's go back, then, to my original step, where you would say "Yes, I'll go along and regard this as confidential."

Now may I ask you this: Why would you say that to him? And that is what I want to get back to, my other question: Would you say it because you would say it to anyone if they even came in and showed you a pencil and asked you not to reveal how it is made, or would you feel there was some basis for Mr. Sommer showing concern about this process being released to other people? How would you feel about it?

THE WITNESS: I think if he has a real -- a reason for concern, and it makes sense, then I think I would go along with him.

THE COURT: Because you think there was some basis for his concern in this case?

THE WITNESS: Well, there might be things you don't think anything of, if you are willing to -- if you want to do the job, you want to get paid for it.

THE COURT: I think maybe I used the words "Would you do it to humor him," and I am trying to find out what your attitude would be. Now you are saying "Well, when I do a job for a man and he asks me to keep it confidential, I keep it confidential." But I am trying to find out if you would agree with him if he said to you, you know, "This came out of my own brain and I just don't want anyone to know about it."

THE WITNESS: I might not necessarily agree to that.

THE COURT: That is what I am trying to find out. That is exactly -- would you say to him "This is a fantasy of yours; this is no novel thought; this is being done in the trade every day," or would you say "No, I agree with you, this is a pretty good innovation"?

I do not know if I am using the right words.

THE WITNESS: I'm not in the -- I'm not generally known for humoring people, but I wouldn't lie to him, either. I think if he wants the thing and if he wants it kept confidential, whether I agree with it or not, I mean what do I care.

THE COURT: Would you agree or disagree with him in this case?

THE WITNESS: As to the method he made it? As to the method we developed? That would be the only thing we would have confidential right.

THE COURT: Yes.

THE WITNESS: Yes, I would agree, because I would have no reason not to, as of that particular method as applied to that -- to that operation.

THE COURT: Let me carry it a step further:

If I brought in the two dies -- let's take 35 -- and said, "Mr. Barton, I want you to make 35 for me exactly as is; can you do it," what would your answer be?

THE WITNESS: "Yeah."

THE COURT: Okay. And then I said "But I don't want you to tell anyone, I don't want you to show it to anyone, other than your employees, people working on it, and one of my competitors comes down here and says 'Could I see the die that was brought in to you, because I'd like to have one just like it' -- if any of those conditions happen, I want you to promise me you will say 'No, I won't reveal that,'" would you agree to it?

THE WITNESS: Yes, I would.

THE COURT: Now may I ask you why you would agree to it?

THE WITNESS: I think that's pretty basic in our industry, that someone comes in and develops for it and pays for the development, you just don't give it to somebody else, keep it a secret.

THE COURT: Would you agree or disagree with me if I said "I want you to hold this in confidence because I don't think anyone else will come up with this idea, how to make C-seals or how to perform what I'm trying to perform"? Would you in your own mind say "You are fantasizing; a lot of people would come up with it," or would you say "Maybe I agree with him; maybe it would take quite a bit of time for somebody to come up with it," based on your knowledge and experience in the field? I take it at times you have said, when someone comes in, "That's a pretty good idea"; other times you have said "Ha, it's a silly idea"?

THE WITNESS: Oh, yes.

THE COURT: How would you feel about this particular thing if I brought it in to you to make a seal?

THE WITNESS: I think it's about the only sensible way to make one.

THE COURT: If I said to you "Don't you think this is an original, novel idea," you would disagree? You would say, I think --

THE WITNESS: Yes, I would disagree.

THE COURT: -- that any good person in your business would probably come up with that idea if presented the problem?

THE WITNESS: Oh, yes.

THE COURT: Would you say that?

THE WITNESS: No question about it.

THE COURT: I think I should get that straightened out.

You said you would come up with this answer. Do you hold yourself any higher than certain level of men in your business?

THE WITNESS: No. I don't think I have fifteen people that would come up with that answer.

THE COURT: You do? All right. How about in your work -- working for you?

THE WITNESS: No, in our plant.

THE COURT: And how about in your general field, say in the State of Connecticut -- well, let's say the State of Connecticut.

THE WITNESS: Oh, I would probably know personally thirty or forty.

THE COURT: What would you call yourself, a tool and diemaker?

THE WITNESS: Tool and diemaker.

THE COURT: And you think there are thirty or forty men of competence that could --

THE WITNESS: There's far more than that, but I would say I know personally thirty or forty.

THE COURT: All right, thank you very much, Mr. Barton.

THE WITNESS: Thank you.

THE COURT: What are your plans now for the rest of the day?

MR. SULLIVAN: You are all through, Mr. Barton.

MR. KELLY: I had one question I wanted to ask Mr. Barton.

THE COURT: Please be seated, Mr. Barton.

RECROSS-EXAMINATION

BY MR. KELLY:

Q One final question, Mr. Barton:

If you assumed that someone had come to you with a die and said "We've got a process that we can make three hundred to four hundred different sizes a year for a customer, it's going to bring us in half a million dollars' worth of business, and we can do this at a tooling cost of around $50 a die," in your mind would you think that would be information, you know, worth protecting or there would be some basis for keeping confidentiality?

A I don't see where this is a concern of mine. I mean in your question.

Q What I am referring to is the number of parts.

You can make several hundred different sizes --

A In other words, I'm going to produce you three or four hundred dies; is that right?

Q That is right. And suppose we say that we can agree on a way to do this at a tooling cost of around $50 a die. Would you consider that would be worthy of keeping confidential?

A Oh, yes, I would think so.

MR. KELLY: No further questions.

THE COURT: One question that has nothing to do with this case, I don't think; but would you mind telling me what is in that picture? It just caught my curiosity.

THE WITNESS: That's a big boring mill with a -- it's actually one of the Harper buffing machines I spoke about. It's one of the largest ones we ever made. And it's turning, the outside. Those are, I believe, about thirty four-inch circles -- holes -- that were bored in there.

THE COURT: What is this for? What do they do with that?

THE WITNESS: It's a form of tumbling machine put out by Harper. It tumbles material.

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Excerpts From the Testimony of George Merwin

GEORGE MERWIN, called as a witness by Advanced Products, being first duly sworn, testified as follows: that he is a high school graduate; that he graduated from the 8000 hour tool and diemaker apprentice training program at Winchester Repeating Arms Company in 1942 [2328-2329]; following his discharge from the military he was employed as a tool and diemaker at Winchester from 1946 to 1950; that in 1950 he founded the Aladdin Tool & Die Company in North Haven, Connecticut, which has about twenty employees [2329]; that Aladdin is a precision tool and die company that specializes in the metal forming of small parts [2331]; that he was a member of the Society of Mechanical Engineers and the National Tool, Die & Precision Machining Association [2333]; that he was President of Aladdin when he sold the business in early 1973 [2330, 2359, 2360]; and that since selling Aladdin he has been semi-retired and is presently employed as a real estate agent [2328, 2360]. Mr. Merwin further testified in part as follows:

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GEORGE MERWIN, called as a witness by the defendants, having been first duly sworn by the Clerk of the Court, was examined and testified as follows:

THE CLERK: Please state your name and address for the record.

THE WITNESS: George Merwin, 335 Chestnut Lane, Mount Carmel, Hamden.

DIRECT EXAMINATION

BY MR. SULLIVAN:

Q Where are you presently employed, Mr. Merwin?

A I'm in real estate for Travis T. Hatch Company in Killingworth.

Q How long have you been with Travis T. Hatch Company?

A Almost a year.

Q Would you trace for the Court, starting with your education in high school up to the time that you joined Travis T. Hatch Company, your education and your employment background?

A I graduated from high school in '37. Took a job as a sheet metal worker at Winchester Repeating Arms Company. I worked there for two years and then applied for entry into the apprentice training program, tool and die-maker, at Winchester's. I was accepted in '39. Graduated the 8,000-hour course in '42.

In 1944 I volunteered for the Navy. Had a crash course in basic engineering, most of the time spent as a motor machinist. I was discharged in 1946.

Went back to Winchester's as a tool and diemaker, and in 1950 I started up Aladdin Tool & Die Company in a small way in North Haven.

Q In 1950 you formed the Aladdin Tool & Die Company?

A Right.

Q Would you describe for the Court the circumstances leading to the formation of Aladdin Tool & Die Company and what Aladdin Tool & Die was like initially and how it changed over the years.

A Well, actually -- I say I started a very small -- one full-time employee and myself and some part-time help; and as I was able to contact customers and get work, I gradually added a piece of equipment, added another full-time man, till pretty generally it became eighteen to twenty man average shop.

Q Where was Aladdin Tool & Die initially located?

A In North Haven.

Q Did it stay at that location over the years?

A It's still there. It's just been added on to.

Q If you were asked to describe the business of Aladdin Tool, how would you describe it? What did Aladdin Tool hold itself out to be?

A Well, actually, I think we were considered a precision tool and die shop. Dealt in dies, gauges and fixtures. Probably percentage -- percentagewise, probably half and half, 50 percent dies, 50 percent gauges and fixtures.

Q When did you leave Aladdin Tool?

A The end of '72, first of '73.

Q Who were the officers of Aladdin Tool during your last year there?

A During the last year there, myself as president, my wife as secretary, and Mr. O'Connor as treasurer.

Q Again focusing on the last year -- and if it changed markedly you can tell me that -- what, approximately, was Aladdin Tool's gross sales?

A Oh, I would say 600,000.

Q Was that true for the --

A For a few preceding years.

Q How many employees were there at Aladdin in the last year, approximately?

A I guess about eighteen, twenty.

Q You said that Aladdin was engaged in the precision toolmaker business. What do you mean by the precision toolmaking business, if you can tell the Court what that means in your business?

A Well, generally speaking, we got into the more smaller parts, more complicated, rather than large forming or metal forming or metal working.

Q In the precision toolmaking business, what kinds of tolerances did you work with generally?

A Probably the general tolerance would be one-thousandths of an inch, but we worked to half of a -- tenths of a thousandth for the government.

Q I believe you said that 50 percent of your business was gauges and fixtures --

A Yes.

Q -- and 50 percent was die work?

A Approximately.

Q With respect to the die work that you did at Aladdin Tool, what kind of dies did you make generally in terms of size and type?

A Well, some small -- nothing too large, although we had some than, you know, a man could not possibly lift, you have to use a hoist. We made simple pierce and blank dies, compound dies, progressive dies, compacting dies. Generally speaking, I think we were probably more known as a progressive die house.

Q In terms of the dies that Aladdin made, what were the price ranges that they ran from?

A From a hundred dollars up to $30,000.

Q Again focusing on the die work that Aladdin did, did Aladdin design as well as make dies?

A Yes.

Q What percentage of Aladdin's business was design as opposed to making, if you can break it out that way?

A Well, actually, when you say percentage design, you mean just design, not make the tool?

Q No, I mean if you just --

A Design and make --

Q Design and make, as opposed to just making.

A I would say probably -- on the die end I'm talking, not the fixture or gauge -- on the die end, about 75 percent we designed and made.

Q In terms of the dies that Aladdin designed and made, can you give the Court some idea of the applications that those dies were used for, the types of customers, some idea of what your business was?

A I would say just about every large -- I shouldn't say every large -- most manufacturers in the area, some out of state: Pratt & Whitney, Colt, Winchester's, Remington

Rand, Sargent, United Nuclear, and a few out of state.

Q In terms of your duties at Aladdin from 1950 to the time you left Aladdin, how would you describe them?

A My own duties at the shop?

Q Yes, from the time you joined it up to the time you left.

A Well, when I started, I guess I did everything, swept the floor and everything else, and gradually got to be where I solicited work, quoted on it, supervised on the floor, and office manager; in latter years union negotiations. Generally speaking, I was pretty much involved.

Q In all phases of the operation?

A Yes.

Q Are you or have you been the member of any professional associations in the tool and die business -- industry?

A Yes, I have been, yes.

Q What were they?

A Society of Mechanical Engineers and National Tool, Die & Precision Machining Association.

Q During your years as president of Aladdin Tool, did you make an effort to familiarize yourself with what was going on in the industry, generally?

A I don't know if it was an explicit effort, but I attended tool shows in New York or Philadelphia, Chicago. I think my biggest education came when I went to visit our customers, where I saw how they were doing operations, and it gave me a very good education. And salesmen sometimes gave us some good ideas, too.

Q So you visited tool shows in the United States?

A Uh huh.

Q Did you attend tool shows abroad?

A Only one, Hanover, Germany.

Q And you visited customers' plants throughout the United States?

A Yes, mostly in our area, except Pensacola, Florida.

Q On the basis of your involvement in the tool and die industry, is it fair to say you had familiarity with what was available and what was being done in the 1950 through 1972 period?

A I think so.

Q I believe you previously testified that you were involved in quoting on die jobs as they came in to Aladdin; is that correct?

A Yes, yes.

Q If somebody came in to you and wanted you to quote on the design of a die to make a part, what would you have to know in order to quote on that business?

A First I'd have to have a part or a print to go by. Secondly, most important, probably, would be his volume, whether he is going to have high production or low production. And what kind of press or whatever he was going to use it on, whether it's going to be power press, hydraulic press or bench press or what.

Q Why would you have to know what his volume was in order to quote on the job, or his production?

A Well, if you are going to have low volume, you are going to have a simple operation. If you are going to have a volume, you are going to put something into it where you are going to get a lot of parts out per hour; and if it's low production you are just going to have a simple die. Cost, mainly.

Q What would you use in high volume, for example, what kind of die?

A Well, I would use probably in high volume a progressive die or a transverse press.

Q Can you explain to the Court first what a progressive die is?

A Simply?

Q Simply.

A Yes. A series of individual dies spaced at equal distance apart to form stations, so there'd be maybe two stations, five stations, ten stations, so you would get the finished part out without handling the part in between all those stations.

Q What would be a simple die? If you were to do the same thing but on a simpler basis than you wanted to make in a progressive die, how would you call that?

A Well, you'd either call it a simple die -- single-station die -- or we -- we had a term, and it's probably generally known, a put and take die.

Q When you set about to make a progressive die with a number of stations, do you use at any point in that process a simple put and take die, and, if so, why?

A Well, if we had a progressive die and there's a station in there to be -- have something developed, like a -- oh, any shape or form, rather than be taking the parts out of the die all the time, unscrewing, undoweling, we have a put and take die that would be working on the bench, easy to put back into the machine to change the shape, and it was nothing more than an upper and lower section most of the time.

Q So you used a put and take die to develop the stations in a progressive die?

A Not every station, but some stations.

Q You mentioned a transfer press; is that right?

A Yes.

Q What is that?

A Oh, it's relatively -- it does the same thing as a progressive die except there's no strip to carry the part. The part is blanked out first, and then fingers transfer it from station to station for the different operations.

Q That is used in, again, high volume?

A High volume, definitely.

Q What do you mean by "high volume"?

A When you are talking -- oh, at least 500,000, a million parts; a million parts would probably be closer for a transfer press.

Q How about a progressive?

A Relatively the same thing, depending -- you could have, oh, 25,000 parts to make a progressive die, but it's got to be a simple one or it doesn't pay to make it.

Q Assume Mr. Sommer from Advanced Products came to you in late 1972, while you were still at Aladdin, and showed you this band, which has been marked as Defendants' CQ, and then showed you this drawing, which has been marked as Defendants' Exhibit CN, to show you the kind of dimensions and tolerances he is talking about, and then showed you this formed C-ring, and said to you -- and for the purpose of this question I know that the band is bigger than the C-ring --

A Okay.

Q -- it is just illustrative -- and said to you "I'd like to form this band into this shape, with tolerances like that," and said to you "I'd like you to design me a die to accomplish that end"; he further said to you that he anticipated low production, ten to five hundred pieces initially, so the die could not be expensive, but he had hoped for future orders, so he would like to have the die durable; and, lastly, he said he anticipated eventually the need for or the ability to make C-rings of varying diameters, three-inch, four-inch, five-inch, and those varying diameters could be two hundred different diameters, three hundred different diameters.

Do you have an opinion based on reasonable probability whether your company could have filled such an order?

A Yes.

Q Would you tell the Court what type of design you would have utilized, what the die would have looked like that you would have designed for Mr. Sommer to fill that request?

A Well, I would have to ask him a couple questions. First is, for one thing, would he be able to supply me the blank -- well, I guess you call it the hoop -- in various diameters and various widths. And also I would probably, first time around, when he came to me, say is the possibility of a pre-form necessary. But I didn't think it was necessary. The reason I say that is, to make an absolute perfect circle, a pre-form is necessary, because the leading edge of the material never quite gets the correct curve on it.

But, yes, I would probably go to and undoubtedly go to a simple put and take die.

Q Now would you describe for the Court what that simple put and take die would look like?

A There would be a bottom plate or disc or whatever you want to call it, and a top. In this particular instance half the shape would be cut in the bottom, half the shape would be cut in the top, and we would orient the two pieces with a center pin. I think we would probably go to a -- I know we would go to an air-hardened steel, for low production probably 5 percent chrome, for more durability 12 percent chrome. It's harder work. We probably would have gone to a 5 percent chrome.

Q Now let me show you what has been marked in this case as Exhibit 35 and ask you if this is similar to the die --

A Yes.

Q -- that you have just described.

A The bottom -- the die sections don't necessarily have to be round, but it's more convenient because of chucking and so forth.

Q With regard to the die that you have described --

A One thing I just tried. The pin on here is a slide fit, a loose fit. I think I would have a press fit in one section.

Q With that difference, would the die be any --

A No.

Q Is that an important difference?

A Not necessarily, except why you have a loose part.

Q With regard to the die that you have described, you said you would put half the C in the top and half the C in the bottom. Why would you do that?

A You got to form the part and you got to be able to get the die apart and get the piece out. I don't know of any other way to do it.

Q With regard to the dimensions of the die cavity, the diameter of the die cavity, where would you get that dimension initially?

A Right off the print. I would initially start and probably use a minimum diameter or maybe even slightly smaller than a minimum, but minimum, anyhow.

Q Why would you maybe use slightly smaller than the minimum diameter?

A Anticipating a little spring, a little bit of spring-back on the material.

Q How about the depth or height of the cavity to be cut into the die? Where would you get that dimension from?

A Off the print.

Q Where precisely would you obtain that on the print in front of you?

A On that particular print, the section AA, probably work to, oh, probably total of 123, 124, 125, which you'd have to put half in the top and half in the bottom.

Q With regard to the bands that you said that you would have to get from Mr. Sommer, you said that you would want to be able to receive from him bands of different diameter and different height.

Where would you get the initial diameter and height of the band that you would ask for?

A Band pretty much -- I -- on the diameter?

Q Yes.

A I would pretty much just start just below the outside diameter on the finished ring and ask him to give me four or five rings in increments of maybe five-thousandths or ten-thousandths smaller to develop. Pretty much just below the outside diameter I would start. On the height, oh, you could come pretty close with calculation by solving for the circumference of the part and subtracting the gap. But that could come pretty close, but I wouldn't -- I wouldn't say you could use that dimension.

Q You would initially arrive at it --

A Initially I start with it.

Q -- and then through trial and error you would develop what it had to be?

A Absolutely.

Q With regard to the die that you testified you would design for Mr. Sommer, and, indeed, the die you have in front of you, why would you use a center pin? Why would you incorporate that in the die that you would design?

A Well, you need something to orient the top and the bottom die sections, and it's the simplest method. There's no reason to have any more than that. Some of our put and take dies did have two pins on because their shape was irregular, it wasn't circular.

Q Here it does not matter where this falls? You could spin it?

A Right.

Q But if it were a rectangular die, would you need more than one pin?

A Definitely.

Q With regard to the die that you have in front of you and the die that you described, would there be any support on the interior of the band as it was formed in the die cavity?

A No.

Q The die that you have depicted on CN is what has been referred to in this lawsuit as an internal pressure. It means that the opening is inboard.

Would you consider that the part or the band would form in there properly without wrinkling on the leading edge if you did not support it?

A Yes.

Q Why is that?

A Well, I've done unsupported work in the past.

Q If you ran into a wrinkling problem on the leading edge, what would you do?

A Well, definitely, I suppose, go to a pre-form.

Q Again in the die that you have described, you said you cut the shape into the die cavity.

What would prevent the metal from flipping around inside there? Would you have to --

A Well, the shape -- the shape of the cavity would really prevent it, because, well, you have -- the surface is a shape of the finished part and it becomes like -- to me it becomes a D when it's completely done, but it can't go any further than the stop section there or the shape of the part; it can only roll as far as the stop is concerned.

Q So there would be a stop cut into the die cavity?

A Yes, by nature of the shape of the part.

Q What is the purpose of the stop?

A Well, to get the shape you are looking for; otherwise, that gap could come anywhere.

Q In terms of the material that you would use to make the die, itself, I believe you said you would use air-hardened --

A Something that would take -- wear-resistant and not change too much in heat treat.

Q How would you cut the cavity into the die, into the tool steel that you would use to make it?

A Pretty much a single pointed tool, tool bit shaped to the -- shaped to the cavity I wanted.

Q So you would start off with a tool bit. And then how would you shape it? What equipment do you use?

A Well, you could use one of two or three. Dress it with -- with a Vinco -- it's a trade name -- wheel dresser, visual grinder, where you'd draw a picture twenty to one or fifty to one, so that your error was very small, or a die form, which works on the principle of five to one. You'd make up a template five times the size of the -- the pointed tool you wanted, and then trace it on the surface grinder.

Q So you would use a surface grinder?

A Yes.

Q A radius grinder?

A No, we'd use a radius dresser.

Q And a surface grinder?

A And a surface grinder.

Q What would you tell Mr. Sommer in terms of the time you would anticipate you would need to make the final die that he came in and asked you to make? How long would it take you? What would you tell him?

A Not talking about lead time, but working time, I would say two weeks if; we wouldn't do it in two weeks, something wrong.

Q In terms of the cost of that die that we have been talking about, the internal pressure, how would you quote it and what would be the price?

A Well, as far as quoting, we always tried, very seldom successful, to try to get hourly rate jobs, where they were cost of time and material, but quoting it, generally speaking, I guess, with 75 percent of our business, it wasn't too much cost plus, and so we'd have to figure out just about how long we thought it was going to take and multiply it by our hourly rate and then what material went into it, which is quite negligible in this case.

Q In terms of how you quote it, if you did not do it cost plus you would give him a firm quote?

A Have to give him a firm quote, yes.

Q What percentage of your business when you are doing design and make is firm quote as opposed to cost plus? What is it?

A I guess quoting was about 75 percent.

Q When you quoted it and you gave him a firm quote, would the quote include the cost of design and make?

A Well, actually I don't even know whether I'd bother to go to design on this particular one, but, yes, it would include any design and make and we'd have to live with our quote.

Q So if it took you longer, it would be your problem?

A Yes.

Q Why would you say you would not even go to design on this one?

A Actually it's so simple, I think I'd just give -- give the toolmaker the print and tell him what I wanted in the material, cut that shape in the top and bottom half, and just let it go at that.

Q Say you made this die and then Mr. Sommer came back and said "We'd like you to make another one that was a three-inch diameter, how about making it three and a half." Would the price be any different for the next one?

A Oh, I think we'd have gained considerable experience on what hoop sizes and things we'd need. I think we could definitely say there'd be a reduction.

Q Do you have any idea what it might be?

A On the second one? Oh, I'd say at least 25 percent.

Q How about if Mr. Sommer came to you and said, after the second one, "Now I'd like a hundred of them"? Would there be a price reduction?

A Yes. You are certainly going to gain from experience and -- actually, I think in time you might not even have to have more than one shot at it.

Q What would the initial cost of the die be, the one you said you would initially make for him, in order of magnitude, if you can give it to me? This is again late 1972.

A If it's a reasonable size, I would say one -- one thousand to twelve hundred dollars on the first one.

Q This is a three-inch diameter?

A That would be represented.

Q So, if he gave you a second order, say, for a three-and-a-half-inch, what would you get down -- you said it would be a 25 percent reduction?

A I would say depending on how much problem we had. If we made the job within the time we quoted, definitely there'd be a good reduction.

Q Again, if he came in and gave you an order for a hundred of them, what do you think you could get down to in terms of cost in making these things?

A No reason why you couldn't get down to within the two or three hundred dollar range.

Q Do you think you could get below that?

A Possibly, yes, I think so.

Q In terms of the die design that you have described, it utilizes a center pin.

Have you had in your experience prior involvements and knowledge of center pins to align die halves?

A Yes. I think my first experience was when I was in Winchester's, which is Olin today, just out of my -- just out of my apprenticeship then. It was in the early '40's. The diemaker was trying to develop the correct shape for a reflector on a flashlight, and, rather than be working and taking his die sections out, he was working out of a similar thing with a center pin, two round pieces of steel, and he was developing the shape of the reflector in that manner.

Q Any other examples that you can think of?

A United Nuclear has given us designs of center pin dies, and also Westinghouse and Pensacola. They have presented us where we've quoted and built them for them.

Q What was the purpose of the center pin in those examples?

A Orientation -- or alignment I should say.

Q Alignment?

A Yes.

Q In those dies that you were aligning, were they top and bottom?

A Top and bottom.

Q Was part of the shape in the top and part in the bottom?

A Yes. It was. Yes, on all of them, yep.

Q You previously testified that the interior of the internal pressure die that you would design for Mr. Sommer would not be supported, the interior of the band as it was being formed inside the die cavity; is that correct?

A That is correct.

Q Have you had any prior experience with the forming of metal where the interior surface is unsupported during the forming?

A Yes. I think I gave you some strips.

Q Okay. I will show you this one.

MR. SULLIVAN: I think this should be CU; is that correct? Maybe we will get it marked for identification. Is it CU?

THE CLERK: Yes.

BY MR. SULLIVAN:

Q Is this the strip that you just referred to?

A Yes.

Q Where was that piece of strip made, and when?

A It was made at Aladdin Tool ten or twelve years ago.

Q While you were at Aladdin Tool?

A Yes.

MR. SULLIVAN: Any objection?

MR. KELLY: No.

MR. SULLIVAN: I would like to offer as CU the piece of strip which the witness has identified as a piece that was made in Aladdin Tool some ten or so years ago.

BY MR. SULLIVAN:

Q What metal is that?

A I think it's berylium -- yes, berylium copper.

Q Is the piece that has been marked as CU an example of forming of metal without the utilization of interior support?

A Yes.

Q Can you explain, with reference to the exhibit, the stage where the metal is being formed without interior support?

A What do you mean?

Q The place on the strip.

A Oh, on the -- on this last station?

Q Yes. Explain it to his Honor.

A Well, actually, in this particular case we have a pre-form, second form, and then in this last station we have an upper punch and a lower punch with half the shape in the bottom half, half the shape in the top, and it closes it and makes a perfect circle.

Q In that state --

THE COURT: But the stop is the metal, itself?

THE WITNESS: The stop is the metal, itself. Yes.

BY MR. SULLIVAN:

Q The metal comes around and it stops on itself; is that correct?

A It stops on itself.

Q During that forming operation there is no interior support of the metal as it is being formed?

A No, no.

Q Now let me show you another strip and ask you where this came from and when it was made.

A It was made probably closer to fifteen years ago. Very similar thing. Again we're stopping on the strip -- on the piece, itself. But no internal support. That was made for an advertising gimmick for Coca Cola. It was part of a cigarette lighter, the flint holder.

MR. SULLIVAN: Any objection?

MR. KELLY: No.

MR. SULLIVAN: I would like to offer as CV the metal strip about which Mr. Merwin has just testified.

BY MR. SULLIVAN:

Q It was manufactured at Aladdin; is that correct?

A Yes.

Q In terms of tolerances, what are the tolerances that you work to in connection with CU?

A On the diameter tolerances it's -- on that one it was plus or minus a thousand.

Q How about the tolerances on CV, if you recall?

A CV, I cannot be sure. I cannot recall that, other than the fact that it had to fit into a retainer and it couldn't be too loose, so I would assume the tolerance was the same, but it might not have been; but I assume it was.

Q In the last forming operation on CV -- I believe you have already said it -- that is the forming of a piece of metal without the utilization of any support on the ID of the forming piece; is that correct?

A That's correct.

Q Again, the metal there stops on itself?

A Yes.

Q In the die that you said you would design for

Mr. Sommer, that does not stop on itself; does it?

A No.

Q With reference to CU, would you explain to the Court what you would do, say, with reference to that exhibit, if you wanted to have the metal stop before it stopped on itself? How would you do it?

A If there were a gap in here similar to the C-ring, we'd have to put a stop in; otherwise, the material would not flow out and fill up that cavity.

Q Now --

THE COURT: Is that a common, well-known concept in your business?

THE WITNESS: Of pushing the material out? Yes. I would say so.

THE COURT: And the use of a stop? If you want to stop the metal?

THE WITNESS: I have not used a stop in anything like a C-ring, ever. I have not had the occasion, because every time we had to make a round part unsupported it was a continuous circle. I have used stops in different concepts, but not in this concept.

BY MR. SULLIVAN:

Q But is the concept of stopping metal if you want a gap there a common concept in your business?

A Well, you'd have to do it if you had a gap; you'd have to have some sort of a stop.

Q The answer to the question is "yes"?

A Yes.

Q The drawing that you have in front of you is the drawing of what we have referred to as an internal pressure seal where the opening is inboard. Assume Mr. Sommer came back to you and said, with all the same qualifications, "I'd like you to make a die with the opening outboard," would you be able to do that?

A Yes.

Q What would the die look like?

A Basically it would be the same die except the stop or D-shape would be on the opposite side.

Q Would you be able to make that die in the same time for approximately the same cost?

A Yes.

Q Let me show you what has been marked as CS, which is a flat washer, and what has been marked as CT, which is what has been referred to in this litigation as an axial C-ring, and ask you, again, if Mr. Sommer came in to you with the same request and showed you this flat washer and this formed piece -- and again we are working to tolerances similar to what we have spoken about earlier -- and asked you whether you could make a die that would form this washer into this shape, and again it is initially low production, so it has to be an inexpensive die, but hopes for future orders, so it has to be durable, do you have an opinion based on reasonable probability whether you could furnish and fill such an order?

A Yes.

Q Would you describe for the Court what that die would look like?

A Well, that would be more than one die. Yeah, that would be more than one die, I think, for economy's sake, yes. Actually, having seen a sketch of yours, I know you do it in three operations presently. I think I would have attempted it in -- to do it in two operations, and maybe I wouldn't have been successful, but I think I would have attempted it first, and, if not, then go to three individual little dies.

Q Would you design more than one die?

A Well, I think it's easier when you are experimenting to do something as simple as possible, and you do have low production, so I would say I would go to individual put and take dies.

Q Assume you have, first of all, two, and then we will assume you have three; but assume you have two dies. What would the dies do?

A Well, first one we'd pre-form, and the second one, if I were successful having a stop on the upper punch, would do the final form. If have to go to three, go to three, but I'd like to try it with two, and I think I'd be successful.

Q If Mr. Sommer asked you how long it would take to design and make those dies, what would you tell him?

A Three weeks.

Q If he asked you to quote on it, including the design in the quote, what would you tell him?

A $1500 roughly.

Q After you made the first die, or dies, and he came in with another order of a washer of a different size diameter, a difference of an inch or two inches, would the price for the next dies be less?

A Yes. Yes, definitely.

Q If you got a series of orders in for different sizes, how far do you think you could get down in terms of dollars to make those dies for Mr. Sommer?

A Well, in this case, if we're talking two or three -- if we're talking three dies, I would say you are going to get down maybe around 600, five or six hundred dollars.

Q You have told us that in terms of the internal-external you would use a hand die, or a put and take die.

Can you conceive of any change in circumstances where you would suggest some other method of forming that, other than the die that you have described? What could change that would make you do something differently?

A Only high production, that I can think of.

Q How high would that be?

A For something like that I'd want to see close to a million parts.

Q What would you use if you got up to that size?

A I would recommend transfer press.

Q As opposed to progressive?

A Yes.

Q Why?

A Actually, it's -- the part is free, and the fingers pick it up and transfer it across. You don't have any tabs to worry about carrying it with.

Q When you are talking about the part as "free" --

A It's not on a strip on this. The part is just as if you were doing single operations where the fingers pick up the part and move it along from station to station.

Q How about if he came in to you with an order for a 25-inch-diameter C? Would you still suggest to him the use of a put and take die, like 35 in front of you?

A A put and take, of course, then -- it's still a put and take die, but it gets pretty heavy.

Q Would there be another method of forming that might make more sense if you got up to that size?

A Well, I don't know whether -- I could -- you could roll it, on rollers, like some of the cosmetic industry does some of their things.

Q Right.

A You could make a die. But I -- it's big, it's heavy. You are not going to put and take it by hand. You are going to have to put and take it by machine.

Q With regard to the die design concepts that you have testified to this morning, in your opinion are any of those concepts anything other than common knowledge in the tool and die industry?

A No, I would say they're common knowledge.

Q With regard to your leaving Aladdin -- when did you say you left Aladdin?

A January 1st -- well, end of December 1972.

Q Can you tell the Court why you left Aladdin?

A Oh, I had had 22 years of it, and it really owned me. I didn't get as much free time as I wanted to, and then, when we went union, I really became disenchanted and decided I just wanted to get out.

Q So you sold your business --

A Yes.

Q -- and you retired?

A Semi, until recently. Business is picking up in the real estate business.

Q In connection with the band that Mr. Sommer would provide you with, if he were to tell you it was Inconel or stainless 300 series, would that cause you any concern?

A No.

Q You work with Inconel?

A I've worked with Inconel and I have worked with stainless.

Q How about if he said it is a welded band? Would that cause you any concern?

A Not if he could assure me there'd be no brittleness or anything involved in the weld that would interfere with the material.

Q Have to be a good weld?

A Have to be a good weld.

Q I just have a couple more questions.

With regard to Defendants' Exhibit CU, in terms of how you make this ultimate piece on the end, can you describe for the Court what the die-forming equipment looks like, if you can, and if it is all similar to the way you said you would manufacture the axial --

A No, actually it's very similar to the axial. There's a pre-form with a -- well, that pre-form has the male and female shape matching, identical, inside to outside. Second one is just a blade coming down with a radius to kick up the sides of the -- this particular part, which is a connector, and the radius on the outside is correct, but the blade coming down -- it's just nothing more than a blade with a radius on the nose, and it kicks up the sides to get these to come in so when you bring the last station down you are inside the curve of the radius.

Q Is that similar to what you described for the multiple die to form the axial?

A Yes, yes.

Q This was made out of berylium; is that correct?

A Copper.

Q Is that expensive?

A More expensive than steel.

MR. SULLIVAN: I have nothing further, your Honor.

THE COURT: Cross-examination.

MR. SULLIVAN: Oh, excuse me, your Honor.

The Clerk advises me that I never offered C[illegible] as a full exhibit. I now so offer it. It is the drawing, your Honor.

THE COURT: Very well.

MR. SULLIVAN: Any objection?

MR. KELLY: No objection.

THE COURT: Full exhibit.

MR. SULLIVAN: Thank you.

CROSS-EXAMINATION

BY MR. KELLY:

Q Mr. Merwin, I wonder if you can identify this folder, the publication I have in my hand here?

A Ready Die. Yes, that was something that was started just as I was leaving. That's a Dayton, Ohio, firm, and I didn't get involved too much in it because it was just starting when I was leaving, but we are --

Q How about these other materials?

A That's all Ready Die. Actually, this is our equipment -- if it's correct, I mean it looks like our equipment list or facilities list. Uh huh. This is new, after I left, I believe, or it was in the -- in the -- in this stage as I was leaving. Mr. O'Connor, who -- who took over from me, got involved in this quite a bit.

Q Does it appear to be correct? Can you tell by looking at it?

A Do you want me to read the whole thing?

Q I just want to know whether you can tell it appears to be genuine.

MR. LaPRADE: Objection, your Honor, unless the witness has time to examine it.

THE COURT: No one said he has not had time. Objection overruled.

Take your time and examine it. Does it appear to be --

A It appears to be authentic.

THE WITNESS: I have not seen it, your Honor.

THE COURT: Where did you get it, Mr. Kelly?

MR. KELLY: From Aladdin Tool & Die Company, your Honor.

THE COURT: All right.

A (Continuing) I could run through this and say pretty much this looks --

Q The facilities list?

A -- as a facilities list. Yes, it does, pretty much, yep.

Q With respect to this enclosure which is headed

"Tooling & Machining Fact File," you see in here there is some reference to different types of dies that apparently Aladdin has, and, if you look through these, I wonder if you could see if this appears to be correct, consistent with your knowledge of Aladdin's capabilities and what they have on hand.

MR. SULLIVAN: Your Honor, I think there might be some confusion. I do not know what he said was in existence when he left, and, if he is reading something that was made after he left, I think that Mr. Kelly ought to put a time frame around his question.

THE COURT: The witness does not seem to be having any problem.

A Well, actually, a lot of these things are things that have probably been done; not formed dies; definitely forging dies we didn't get into while I was there, really; extrusion dies very, very -- I think this is a little bit of an exaggeration on -- they have done 'em, but not that -- not while I was there did we go through all these different dies.

Q Had you seen this folder before?

A I believe I have seen that folder, but I can't be positive -- or one similar to it.

Q Among these documents, what had you seen before you left Aladdin?

A Well, the machinery and equipment list is probably even new, too. I don't think I've seen any of those.

Q When I asked you to look through this list of dies here, I did not see the term "matched metal die."

Are you familiar with that?

A No, we have never used the term.

Q Is it your conclusion that most of this material was produced after you left Aladdin?

A On the Dayton items, yes, and the machinery list is probably up to date, too.

Q So you said you are not familiar with the term "matched metal die"?

A No, sir.

Q Let me ask you, Mr. Merwin, how you came to be called as a witness in this matter. Who contacted you initially?

A Mr. Sommers.

Q You know Mr. Sommer personally?

A I've known Mr. Sommers for a good many years, but that's about it, as a business --

Q Have you done business with the Advanced Products

Company? Are they a customer of yours?

A Yes -- they were.

Q While you were at Aladdin, while you were president of Aladdin?

A Yes, sir.

Q What sort of business did you do for them?

A Very, very little. They were a negligible customer. If we had a hundre customers they'd be 98th or 99th on the list.

Q Do you recall what types of things you might have done for the Advanced Products Company?

A Nothing of any great degree. I know we made some dies to make some retainer plates and did a little machining for them on retainer plates.

Q Was that for O-rings, metal O-rings?

A No.

Q Please?

A No, sir, it was not.

Q The retainer plates were not for O-rings?

A I don't know how they were used, to tell you the truth.

Q Oh, I see. You do not know how they were used?

A No.

Q Do you know when this was? Can you state it in a period of time?

A Oh, actually, I guess, over the years we probably did a little bit of work with 'em each year, nothing of any great -- they were inconsequential as a customer.

Q You stated, I believe, that if you were going to characterize Aladdin Tool & Die you were probably known as a progressive die house; is that true?

A I would say in the die field, yes.

Q Now let me ask you a couple of questions with respect to these exhibits which have been marked CU and -- CV is it?

A I don't have it here.

THE COURT: I have CV.

Q With respect to Exhibit CU, first of all, this was made in a progressive die?

A Yes, it was.

Q Just so my understanding is correct, in a progressive die is it true that you would have a continuous strip --

A Yes.

Q -- of material --

A Yes.

Q -- coming off a coil, and it would go through a series of stages, and at each stage there would be a different operation performed, and then at the final stage, the final step, you would get a finished part or a partially finished part?

A Yes, generally speaking, you would try for a finished part, but you might have to go to a secondary operation.

Q Did you identify what that part was?

A That's a connector, an electrical connector.

Q What would it be used in?

A I am not positive. I would assume the wire -- electric wire is soldered in this end and this is snapped into a female connector.

Q Do you know who this was made for?

A Winchester Electronics.

Q Did you say that was about ten, twelve years ago?

A About that.

Q Do you know how much the cost was of the progressive die that was used to fabricate that part?

A I would be guessing at the moment. I would say it was probably, oh, four or five thousand dollars.

Q With respect to Exhibit CV, if I recall correctly, was this the one that was part of a lighter, did you say?

A Yes, the flint holder.

Q That was around fifteen years ago?

A Uh huh.

Q It was older than CU?

A Yes. That was the first one I had ever done unsupported.

Q Was this also a progressive die?

A Yes, it was.

Q Do you recall how many pieces you had to make for this?

A We didn't actually make the pieces. We just made the tools.

Q Oh, you just made the die?

A Right.

Q Someone else --

A Made the parts.

Q Do you know what the proposed volume was for that particular part?

A No, but I am -- I would assume it would have to be quite high. What it was was a little Coca Cola bottle made into a little lighter for advertising.

Q Yes, I think I saw those.

Do you have an idea what the cost of the die was used in the manufacture of that part?

A I would say pretty much it would run -- it probably ran a little bit more for the simple reason -- on this particular one -- it isn't a good example, but these are inside threads we had never tried before, and we stamped the threads in, and when they rolled the part around, the threads had to match. The threads are not quite as deep as they should be, but that's what they are for, adjusting the flint in the spring.

Q So with respect to Exhibit CV, you feel the progressive die used to make that part may have been a little bit --

A Just a little bit more, but not much.

Q You gave some testimony that business at Aladdin was around $600,000 gross sales?

A Yes, sir

Q What year would that have been, please?

A Actually probably outside of -- I would say in the last five years or -- that I was there -- it ran around 550 to 600 thousand dollars.

Q Are you able to state what portion of that figure is attributable to work done on progressive dies?

A Oh, on strictly progressive, probably 25, 30 percent.

Q How about transfer?

A Transfer press? Less than 20 percent.

Q So that is about --

A About 10 percent probably on transfer press.

Q So something less [illegible]n half of that total is as a result of progressive and transfer press?

A Right.

Q What do you think, as you recall now, made up the remaining portions of that business?

A Single-station dies, blanking or forming or piercing and gauges and fixtures.

Q You do machining in the Aladdin Tool & Die shop?

A Yes. We don't do too much production, but we do some.

Q Do you use die forging? Did you while you were there?

A No, we didn't -- I didn't get into die forging.

Q I think in the first hypothetical question that Mr. Sullivan asked you, about forming an internal pressure seal, you used the term "put and take die"?

A Put and take.

Q This was the first time I heard that term. What does that refer to?

A Actually, I don't know where the name originated, but you put it together and take it apart by hand, I assume.

Q That is sort of a descriptive name?

A Yes.

Q You said that you would use a center pin for the purposes of aligning the top and the bottom half?

A Uh huh, yes, sir.

Q If you had occasion to use a die like that for a run of five hundred pieces of something, might you go to a die shoe instead of a center pin?

A I don't think I would for that kind of --

Q It would take --

A Unless the part were so big that you need something to raise it up and down.

Q It would take a higher volume before you would consider that?

A I would say so; unless you get into the thousands, I wouldn't bother.

Q Let me show you another die, Mr. Merwin. It has been marked as Exhibit 72.

Can you just take that apart and give an opinion as to what it is?

A I'd say it's a C-ring.

Q How about comparing it to Exhibit 35, which is also in front of you?

A It's not exactly, outside of case size.

Q You had testified in response to the hypothetical Mr. Sullivan put to you that you would be getting the hoops supplied from the Advanced Products Company?

A Yes.

Q I assume that you would not ordinarily be in the business of welding Inconel strip, making these hoops?

A No, sir.

Q I am afraid I dropped a line of questioning a minute ago. You had said that you knew Mr. Sommer through business contacts?

A Yes, sir.

Q You recall initially when you were first contacted and asked about possibly testifying in this case? Just roughly.

A Roughly? About a year ago, I guess.

Q How many meetings or contacts have you had within the past year about this matter?

A I had that -- that -- the first meeting, and then I didn't hear any more from him and I assumed the case had either been dropped or something -- I didn't know -- until, oh -- I guess I've had three or four, three, anyhow, or four meetings, this year.

Q Who was at these meetings in addition to yourself?

A One time I guess Shaun was there -- all except one time; and Mr. Carter was there one time.

Q How about Mr. Sommer or Mr. Kramer?

A Mr. -- yes, Mr. Kramer I met at one of the meetings, yes, and Mr. Sommer.

Q Where were the meetings held?

A I was over to his office.

Q At the Advanced Products Company?

A Advanced Products' office. Yes.

Q Did you have occasion to see how they made C-seals?

A Yes. I did.

Q How recent was this, these last meetings?

A Well, actually I had one yesterday -- oh, no, I beg your pardon -- Monday.

Q Now a couple of questions on the dimensions that would be used in the band.

Would you state once more just for my own understanding how you would go about arriving at the dimensions? I want to consider two dimensions, first the diameter of the band and secondly the height; so why don't we take the diameter first, and, if you would, just state once more how you would arrive at that dimension.

A Oh, on that I think I would use a trial and error method starting near the maximum -- the outside diameter on the inside seal, or ring, and then ask him to make hoops of increments, working in towards the center; but definitely it couldn't be larger than the outside diameter.

Q Yes.

A And I think that would be the best way to approach that situation.

Q How about the height on the hoop, itself?

A The height actually can be calculated within reason, and I would probably start from a calculated dimension on the height.

Q If you can explain it conceptually, how would you make that calculation, or how might you do it?

A Basically you get the full -- well, not the OD or the ID, but we take one-third in our business for forming a radius or a corner to get our true line of bend or something, whatever you might want to call it, and -- so we'd solve the circumference on that one-third from the ID -- thickness of the stock, now, I'm talking --

Q Yes.

A -- one-third of the thickness of the stock added to the ID, the inside diameter; and after you found the full diameter -- circumference, I beg your pardon -- you would have to calculate what the gap is by trigonometry, and subtract that from that, and that should give you pretty close -- it should give you the hoop height.

Q What might you anticipate if your diameter was too large on the hoop?

A I don't think you'd start with a -- too large a diameter, because you couldn't get it into your cavity.

Q Suppose you found by trying it that, even though it was in the cavity, it might not have been positioned in the right location within the cavity, having in mind that we are working with rather close tolerances here. Let's assume for the purpose of the question that the band is incorrectly-- it will fit in the cavity but it is incorrectly positioned because there has been a slight error in the diameter. What might result from such an error?

A Well, if the -- well, if the hoop -- say it came right down into the center line. You would close it and you wouldn't get any shape; you would probably crush it.

You might get a buckling or a mashing?

A But if it was out where you had the leading edge to flow the metal, you shouldn't.

Q How about an error in the height of hoop? What do you think that might --

A If the hoop height was too high, too wide, when it came to the stop, when it -- when the material flowed and came to the stop, it would then buckle the O or C-ring --

not O-ring. It was too small, I don't think you would get a proper shape, because it just wouldn't have any pressure to force it out to the outside.

Q I think you said in response to the hypothetical question Mr. Sullivan asked you, about how long it would take you to make the first die for an internal pressure seal, about two weeks of work time?

A I would anticipate. I have never made one.

Q I thought you said not including lead time?

A Well, what I -- when I talk lead time, I'm talking how busy are we --

Q I see.

A -- how many customers are ahead of him.

Q So your answer, then, was two weeks once you start working?

A Actual work.

Q Once you start working on that project?

A Yes, sir.

Q You have not actually ever made a C-seal die; have you?

A No, sir.

Q Have you been approached by any metallic seal manufacturers who asked you to make a die?

A No, sir.

Q I believe you gave two examples of dies that you had worked with that used a center pin for alignment. Was one of those a reflector on a flashlight?

A I hadn't worked on it. I saw it. That was when I was working for Winchester's.

Q You saw that being used.

Do you know if there was any unsupported forming on the flashlight reflector?

A Oh, that was all -- that was all supported.

Q I have in my note here something also for United Nuclear?

A Yes, sir.

Q Is that something that Aladdin did?

A Yes. We quoted and built these round dies for them, with a center pin.

Q Do you know what those dies were used to fabricate or to form?

A No, I don't. Many times, for them, especially, it was security things that I didn't know what the end product was.

Q Do you know how long ago that was?

A Oh, I think we -- I think we made one the last year I was there for especially Westinghouse in Pennsylvania -- in Pensacola. United Nuclear was probably two years before.

Q Do you know what the cost of the die was?

A Well, relatively -- material was a little expensive on that, because they were fairly good -- I would think it was probably around seven or eight hundred dollars.

Q Now I want to ask you to look at Exhibit CU for a moment, again.

A Yes, sir.

Q That is the lead for an electrical wire?

A It's a connector.

Q A connector?

A Yes.

Q Did you experience a wrinkling problem in making that particular part?

A No, we didn't have any problem at all on that one.

Q Do you know why you would not anticipate a wrinkling problem in forming that part?

A We just never ran into it. No, I wouldn't anticipate a wrinkling problem because it's pretty straightforward.

Q All right, let me see if I can ask it this way:

If we go back to the hypothetical that Mr. Sullivan put to you on forming an internal pressure C, might you anticipate a wrinkling problem in that situation?

A Well, with the gap that they have there, I don't think I would have anticipated, but I would say, not having made one before, I was gambling a little bit and I -- I probably could have lost out on it, you know.

Q You might have had a wrinkling problem, in other words?

A It's possible. I don't think so with that size gap, though.

Q Suppose we assume for a minute that you tried a die, based on the hypothetical question Mr. Sullivan asked, for an internal pressure seal, and you got down to forming it and you found it was wrinkling and it was not forming into the proper C configuration.

What might you do to try to correct that?

A I wouldn't -- I really wouldn't anticipate it -- well, as I would have said to Mr. Sommers had he come to me, I might want a pre-formed die.

Q Do you think it would have been your inclination to suggest or to request a need for pre-form in making a configuration like that?

A Well, very frankly, I think in my quote I was allowing for pre-form, which is a simple die, but I would definitely try without it first.

Q But you would see the realistic possibility of a need for pre-form, as you envision the problem?

A Yes, I would.

Q I am going to show you a die, Mr. Merwin, which has been marked Exhibit 47, and ask you just to take a minute here -- it may be a little bit hard in coming apart, but see if you can take that apart, examine it. Take your time. I would like to have your opinion on what you think it might be used for.

A I need something to pry it. Does that just slide out?

Q It will come apart. I am sorry, it is just a little bit -- see if I can.

If you would, just take a few minutes to look that over.

A I think it probably makes a -- I think it makes a ring, but I don't know for sure whether it makes -- no. Might be a pre-form or it might -- I think it might be a pre-form die, and yet it has the curve on the outside. I don't know. I really don't know.

Q I will show you a seal here, which is marked as Exhibit AP --

THE COURT: May I ask this: What is troublesome about determining what that makes?

THE WITNESS: Actually -- you mean why can't I be sure? Because I really don't see how this darned thing is operating, and -- if I had a blueprint of this maybe I could understand, you know, what this is, but, just to look at it, I don't know whether these are -- these imperfections here are part of the die. I really don't know what -- you see that? I think they're imperfections. I'm not sure. But definitely this is the shape of a -- I can see that there's forming being done in here. But to me it appears like it is a pre-form. I'm not sure. I mean there's so many different ways to do things, your Honor.

Oh. Wait a minute --

BY MR. KELLY:

Q I have here a seal marked Exhibit 34. Obviously it was not made in this die. But you think it might be possible that this type of configuration was made in the die marked 47? It is almost similar, as you can see generally --

A Yes, I would say it's -- it's possible.

Q By looking at that die, do you have an opinion as to how many stages there are in the forming?

A I'd almost think it's a single stage, a single operation. I mean --

Q When you were testifying on the forming of a so-called axial seal --

A Yes, sir.

Q -- was it your opinion that you would necessarily start with a washer to form an axial seal?

A Yes, it was.

MR. KELLY: Excuse me one moment, your Honor.

Q Mr. Merwin --

A Yes?

Q -- do you know how large a size washer it might be practical to obtain if you wanted to make an axial seal?

A About how -- about how -- I --

Q You know what your limitation would be on diameter for washers that would be available to make such an axial seal?

A I -- on an axial seal, yeah; that's the one like that.

Q Yes.

A Limitation on the size of the washer?

Q If you know.

A I really don't know, but I mean I've seen, you know, large things blanked out. But I have never done it, so I would say -- I don't think I'd want to see one over 18 inches in diameter.

Q I just want to confine this within your knowledge.

A Yeah.

MR. KELLY: I have no further questions, your Honor.

THE COURT: Anything further, Mr. Sullivan?

MR. SULLIVAN: No, your Honor.

THE COURT: Mr. Merwin, you were asked several hypotheticals. I would like to ask you one.

Would you take a few minutes out -- and I will even call a recess -- if you have to go somewhere for personal comfort, you can --

THE WITNESS: I was going to ask you pretty soon, your Honor.

THE COURT: When you get back, outside the presence of the attorneys -- I mean they could be in the room -- would you just sit back and read something I am going to give you.

THE WITNESS: Glad to.

THE COURT: I would prefer you not talk to the attorneys about it during the recess. Just take it, yourself, and sit down. And I am going to ask you this question:

Assume I came into your place of business in 1972 and said, "Mr. Merwin, do you know what a C-seal is," what would you have said?

THE WITNESS: I don't know.

THE COURT: And then I showed you one --

THE WITNESS: Like this? Here?

THE COURT: Right -- and I said, "Okay, this is what I mean by a C-seal, and I want to make these," and I jotted out some ideas on some paper.

" I would appreciate it if you would go through and read it, and at the end of your reading would you tell me what your initial reaction is as to whether I am on the right track or the wrong track, it is not a good idea, it is a bad idea, you have something better, or it is great." What would you say? Would you be willing to do that?

THE WITNESS: Surely.

THE COURT: So would you be willing to do it for me?

THE WITNESS: I most certainly would.

THE COURT: All right, we will take a fair recess, ten minutes, fifteen minutes, to give the witness a chance to read through Exhibit R.

(A recess was taken.)

THE COURT: Have you had enough time?

THE WITNESS: In all honesty, I have read this once before, your Honor.

THE COURT: Okay. That means that you formed an opinion earlier, too?

THE WITNESS: I honestly did not study it. I read it through, and there was a couple things that I didn't understand -- or one, anyhow.

THE COURT: Okay. What do you think of that memo?

THE WITNESS: Generally speaking, I would say the concept of -- the forming is what I would be interested in seeing.

THE COURT: Yes.

THE WITNESS: Reasonably good.

THE COURT: Would you explain for me what the difference is between one, two, three and four?

THE WITNESS: That's the question I had. I don't know what he means by "straight mechanical compression" on two and three.

THE COURT: You do know what rubber press forming --

THE WITNESS: Yes, sir.

THE COURT: How does that differ from metal die set split?

THE WITNESS: Well, actually, in this rubber forming, actually, you would have the shape of the OD that you want and you'd compress the rubber. We didn't use rubber in the latter years; we used Elastocone. It was more stable and was better -- did a better job -- and actually expand that in to fill out the shape of the outside.

THE COURT: Why wouldn't you follow that idea?

THE WITNESS: In this instance?

THE COURT: To make a seal.

THE WITNESS: I don't think -- well, mainly because it isn't necessary, and if the gap were closer together you might have a little trouble getting the Elastocone out. But I think it's simpler to go the straight line method that we have there.

THE COURT: So, if you read this memo,

you would have told Mr. Sommer "My opinion is you ought to" --

THE WITNESS: My opinion is to go to forming of a put and take die like -- like it is.

THE COURT: Even though you would have read that?

THE WITNESS: Even though I read that memo. Except that maybe on larger diameters I might want to go to pre-form, if we had to go to a pre-form, with rubber forming or Elastocone.

THE COURT: All right. Would anyone like to ask any questions based on what the Court asked?

MR. SULLIVAN: Just one question.

REDIRECT EXAMINATION

BY MR. SULLIVAN:

Q When you say you might use rubber press for the pre-form, in other words, if you decided you need a pre-form, you might use a rubber press method to obtain the pre-form?

A Yes.

Q And how would you get the final C?

A The same way we're doing now.

MR. KELLY: I have one question.

THE COURT: Surely.

MR. KELLY: Can I show Exhibit R to the witness, your Honor? I just want to refer --

RECROSS-EXAMINATION

BY MR. KELLY:

Q Mr. Merwin, take that. I just want one question here.

A Yes.

Q If you turn to page 3, paragraph 13-A, you see in the right column there is a sketch --

A Yes.

Q -- of what appears to be a slug or a hoop in cross-section. Then there is superimposed a forming operation, the beginning of a forming operation?

A Uh huh.

Q I believe in your testimony you stated that you think you would put the hoop initially near the outside edge of the cavity; is that correct?

A For an inside -- a gap.

Q For an internally pressured --

A Yes.

Q You think that is consistent with the sketch in 13-A?

A He really doesn't show it in any sort of a groove, but this is going to be -- that would be, if that's the center line -- yes, it is -- that would be an inside gap, ring, yes. But he doesn't show the hoop placed in in any sort of a groove.

Q It does show a forming operation which appears to go out somewhat to the --

A Yes, although -- I don't think you bounce it out quite that far. The sketch is probably not to scale.

Q You had seen this memo before?

A Yes, I had.

Q This was at one of your meetings?

A Yes, sir.

Q Did you discuss the memo or did you --

A We didn't discuss the memo at all. I read it.

Q You just read it over?

A I never discussed it.

MR. KELLY: No further questions.

MR. SULLIVAN: Just one, your Honor, so there is no confusion.

FURTHER REDIRECT EXAMINATION

BY MR. SULLIVAN:

Q With regard to page 2 and 11-4, where it says "Match metal die split half C in the top and half C in the bottom," is that what you described how you would go about doing it if Mr. Sommer came to you?

A Yes, except the terminology we -- I wouldn't have used, because I hadn't heard it.

MR. SULLIVAN: That is all I have.

MR. KELLY: No further questions.

THE COURT: You are excused.

THE WITNESS: Thank you, sir.

(Witness excused)

THE COURT: I suppose this is just about what you planned for the day, Mr. Sullivan?

MR. SULLIVAN: Yes, your Honor.

THE COURT: All right. How about tomorrow?

MR. SULLIVAN: When your clerk called yesterday, Mr. Russell was scheduled for this afternoon, and I asked him when the next time he could come up was. He cannot come tomorrow, as he previously indicated; he has exams. And he could not come Friday. And no court on Monday. Tuesday he had a conflict which prevented him from being here; he also had an evening engagement. The next time he said he could be here was Wednesday.

THE COURT: Morning?

MR. SULLIVAN: Afternoon, your Honor,

* * * * *

Excerpts From the Testimony of Robert W. Russell, Jr.

ROBERT W. RUSSELL, JR., called as a witness by Advanced Products, being first, duly sworn, testified as follows: that he is presently a student at the University of Maryland; and that he was formerly employed by Pressure Science as a production expediter. Mr. Russell further testified in part as follows:

* * * * *

ROBERT W. RUSSELL, JR., called as a witness by the Defendants, having been first duly sworn by the Clerk of the Court, was examined and testified as follows:

THE CLERK: Please state your name and address for the record.

THE WITNESS: Robert W. Russell, Junior, two s's and two l's, 9877 Good Luck Road, Apartment T-2, Lanham, Maryland 20801.

DIRECT EXAMINATION

BY MR. SULLIVAN:

Q Mr. Russell, are you presently employed, or what are you presently involved --

A I'm a student at the University of Maryland, completing my Bachelor's Degree.

Q When do you expect to receive that degree?

A In August.

Q Would you summarize for the Court, beginning with your graduation from high school, giving the Court that date, your employment and educational background up to the time that you joined the University of Maryland?

A I graduated from Frederick High School in Frederick, Maryland, in 1965. In the fall of '65 I entered Dartmouth College in New Hampshire, and left -- pardon me --

left there in the spring of '66. In the fall of '66 I entered the Army. I was in the Army for two years and eight months, was discharged in the -- in May of 1969. I immediately began work with Congressional Movers, Forestville, Maryland, first as a truck driver and then as this office manager. I left them in the spring of 1970 and began attending the University of Maryland in the summer of 1970, and I attended the University of Maryland until the fall of 1971. In January of 1972 I began work at Pressure Science.

Q Would you describe for the Court the circumstances surrounding your joining Pressure Science, how you happened to go there and why?

A I left school and decided to go to work to obtain some money to go back to school.

Q Were you putting yourself through school?

A Yes, I was.

Found an ad in the Washington Post for a shipping clerkat Pressure Science, went there, was interviewed, and was hired.

Q Would you describe for the Court what your duties were when you joined Pressure Science as shipping clerk?

A I handled all shipping and receiving for the company, anything other than correspondence, raw materials that were received, finished parts that were shipped, and other things, such as office supplies and janitorial supplies. I also maintained finished parts inventory, in the shipping area, and logged dollar amounts of finished parts that went out that were used as a check for accounting purposes.

Q So you had an understanding of what went in and what went out of the plant, generally?

A Yes, yes, I did.

Q At some time after your initial employment by Pressure Science, did your duties change?

A Yes. Approximately --

Q How did they change?

A Approximately five months, five to six months, after I began there, I was asked to move into the production office as an assitant to the production manager. I was called production expeditor.

Q What were your duties as production expeditor?

A I maintained control over the shipping and receiving area. A new person was moved there, and I supervised her, and I also was a liaison between all the different branches of the company for the production office. I had dealings with sales, with the business portion of the company, the accounting portion and engineering. I was to coordinate our efforts between their -- their efforts. I also had control of the production schedule, which was to know where each part was in the process of manufacturing at all times. I maintained statistics that were used partially as a check for accounting purposes and partially to show production progress, and I held a weekly meeting of the production supervisors and the machine shop supervisor to again check where each part was in the manufacturing process and when it was expected that that part would be completed so that I would be able to notify the other branches of the company; and, as well, I kept a daily running record of all the parts in the manufacturing process.

Q So, with regard to a part, you were involved in each stage of its manufacture as it moved through the plant?

A Yes. I followed each part, stage by stage.

Q Now would you focus for this portion of your testimony on metal C-seals, and would you describe for the Court how an order was received at Pressure Science and how that order, the typical order, was filled, how it traveled through the plant from the time you got the order to the time it went out the door, and what your involvement was?

A An order typically was received by phone in the sales office. It would then be typed up, the order would be typed up, in the form of a work order. An advance copy would then be sent to me; and I will talk about that. Then the work order went to -- the work order, itself, went to engineering, where a drawing of the part would be attached, and then sent to me in the production office.

With the advance copy that I had already received, I first checked our finished inventory to see if perhaps we could ship the parts without having to manufacture additional parts. If there were not enough parts in finished inventory, I would then check to be sure that we had raw materials on hand to manufacture the part. If not, they would have to be ordered. Then I would check with the branch, be it seals or couplings or flanges, to see if there would be any problems in manufacturing the part, if they -- in other words, if they had correct tooling or other parts that they might need to manufacture the part. If not, then I would go to the machine shop supervisor and schedule that part to be -- that part or die or whatever tooling was required. I would make sure that that part could be scheduled for manufacture.

After I received the work order with the drawing attached from engineering, I gave the work order to the proper supervisor and then followed the part daily or at least weekly in our weekly meeting through the production process. Next time I would see the work order would be when the part was finished and it came to shipping to be sent out with a copy of the invoice which I received from accounting.

Then the work order would be sent from shipping back in to me in the production office, I would log it in again with the various statistics that I kept and give the completed work order with the completed copies of the billing to accounting.

Q In connection with your duties as production expeditor, did you have access to all areas of the plant?

A Yes.

Q Were there any limitations placed on you?

A No.

Q Why would you have access to all areas of the plant in connection with your duties as production expeditor?

A For two reasons: I was the liaison between all the branches of the company, and, as well, I had a need to daily follow certain parts or all parts. If a particular part was on a rush order, then I would follow it even more than daily, and so would have to have complete access to the plant.

Q Did you on a daily basis go to the production area of the plant; for instance, the MCR production area? Were you in there frequently?

A At least daily I went to -- at least daily and more often, more frequently than that, I went to at least every part of the plant.

Q In connection with your duties as a production expeditor, did you develop an understanding of the basic elements of the MCR production process?

A Yes.

Q Would you explain to the Court what you remember about that process today?

A A metal strip would be cut from a roll of metal strip to a predetermined length. It would then be welded together using other pieces of metal that were called tabs, along with the welding line. After the part was welded forming a circle, the tabs were then broken off and the part would go through a series of forming stages. The pre-forming stage was -- would be a part where the -- the seal was at least partially formed, sometimes completely formed, sometimes in one stage, sometimes in more than one stage, so that the metal would not be too greatly stressed. If the seal was strictly pre-formed, it would then be put into a large set of dies and compressed on a large press to its final shape. Some of the seals that were too large for dies would be finally formed by rollers, the same -- in the same manner that the pre-forming was done, by putting this metal circle into a set of rollers that were male and female in the shape of the C. The rollers would then be tightened together and rolled so that the metal seal -- metal circle began to take on the shape of the final seal. And after the die pressing or roller finishing, whichever final shape it took, the part would be polished or sanded using an emery cloth or some abrasive to eliminate both the welding line and also to polish it to tolerances. Somewhere in between welding and sanding it was heat treated; some of the parts were heat treated. I don't remember exactly which. I do remember that heat treating was used. Then, after sanding, the part would be sent to the inspection area, where the part was checked for dimensions and approved or not approved. If it was required by the customer, the part would then be plated. The two platings that I remember that we did were silver and indium. Some plates -- some plating would have to be done outside the plant, such as gold or gold over silver. And after plating was completed and/or inspection was completed, the parts would be packaged in the inspection area, sent to the shipping cage, where they were sealed, whipped with a copy of the invoice.

Q With respect to the type of metal that was initially used that you cut the strip off from, do you know what kind of metal they used there?

A I can remember some names. I can remember Inconel; I can remember different stainless steels, though it seems to me the stainless steels were mostly used in couplings and flanges. I do remember that Inconel was used a great deal for seals. I don't remember specific numbers. I can remember Inconel X-750, but that's all. I don't even know if that's correct.

Q How about the die that you have testified about? What did that look like?

A The die that was used to -- when the seals were to be pressed into final shape in a large press -- was a round solid disk that the seal would be placed into. It had the final shape cut out of it in the shape of a C, and the piece of metal would be fitted into the die and then compressed into its final shape.

Q You recall how those two pieces of the die were held concentric?

A I remember that they were held concentric. I don't remember exactly the specifics of that, no.

Q Do you recall that Pressure Science also made noncircular metal seals?

A Yes, I can remember specifically making oval-shape seals that were called racetrack seals.

Q How did they make those?

A In the same method, using dies that were cut to oval shapes.

Q With regard to the packaging, say a seal had been indium-plated. Do you recall how those seals were packaged?

A Indium-plated seals, yes. They were packaged between -- the seal, itself, was handled very carefully, because the indium was very soft and would be smeared even by touching it with the fingers, and was placed between two pieces of air bubble plastic and then put into the envelope that would be sealed in the heating cage -- in the shipping cage -- I'm sorry -- sealed by heating it.

Q With regard to the source of supply for the strip that was used, were you familiar with the source of supply?

A The major source that I can remember was Pfizer, Pfizer Metals, I believe. At that time I knew the rest of the sources, but that's the only one that stands out.

Q Did you know those because you were involved in that in connection with your duties as production expeditor?

A My specific duties did not involve that, but on occasion I helped Mr. Phillips, who was the purchasing agent, when he was backlogged. I would sometimes call in orders for him.

Q How about the suppliers for, say, the ~~L seal~~ tool steel they used to make dies? Do you know who they were when you were there?

A I don't remember specific names, but I had occasion to call them.

Q When you became a production expeditor, who did you report to?

A When I became a production expeditor?

Q Let me back up. Probably I should ask you this:

When you initially joined Pressure Science and you were shipping clerk, who did you report to?

A Mr. William Phillips.

Q Who was he?

A He was the purchaser or buyer for the company.

Q When you became production expeditor, to whom did you report?

A David Kramer.

Q In connection with your duties as a production expeditor, I gather from your testimony you had an opportunity to view each manufacturing step in the manufacture of metal C-rings while you were at Pressure Science; is that correct?

A Yes.

Q Do I also understand that you understood the sequence of manufacturing, you knew what came after what when you were there?

A I understood the basic sequence because I had to. I had to know at what stage a part was so that I would know how long it would require for finishing the product.

Q Why did you have to know that?

A Because I dealt daily with delivery schedules and was required to know when a customer could expect to receive his part.

Q As a production expeditor, did you also have access to the drawings that Pressure Science used for the MCR tooling or the metal seal tooling?

A Yes.

Q How about the drawings it had for the MCR's, themselves?

A Yes.

Q At any time during your employment at Pressure Science, were you ever asked to sign a nondisclosure agreement?

A No.

Q Do you know what it is? Do you know what one is?

A Yes.

Q While you were an employee at Pressure Science, were you ever aware that such a nondisclosure agreement existed?

A No.

Q While you were an employee at Pressure Science, were you ever advised that Pressure Science's metal C-ring manufacturing process was confidential?

A No.

Q Were you ever advised that Pressure Science's metal C-ring process should not be revealed by you to third persons?

A No.

Q Were you ever aware that any such advice was given to any Pressure Science employee; that is, that the MCR manufacturing process was confidential and that it should not be revealed to third persons?

A No, I wasn't.

Q While you were at Pressure Science, if I understand your testimony, you were not directly or indirectly made aware that it considered its metal C-ring manufacturing process confidential and should not be revealed to third persons?

MR. KELLY: Objection, your Honor. I think it is a leading question. It's characterizing directly or indirectly, "made aware," and I think he can get it out of the witness without that characterization.

THE COURT: Overruled.

Do you understand the question?

THE WITNESS: Could you repeat it, please?

(The pending question was read by the reporter as above recorded.)

A I was not aware of that, no.

Q While you were at Pressure Science, did you ever observe any actions taken by anyone at Pressure Science to somehow protect or control the use of any information at Pressure Science?

A Only one. I remember proprietary stamps being used on drawings that were sent out of the plant. Specifically I remember that these -- proprietary stamp was on tooling and I believe flanges and couplings and perhaps seals, but I don't remember.

Q What understanding, if any, did you have as to why that stamp was placed on those drawings?

A I assume that --

MR. KELLY: Objection, your Honor.

THE COURT: How is this relevant?

MR. SULLIVAN: I think it is relevant to bring out what his understanding was concerning what Pressure Science considered with respect to its MCR manufacture.

THE COURT: If he got this understanding from anyone in authority, I will allow it, but if it is something he thought up, himself --

MR. SULLIVAN: Okay, I will ask him that.

BY MR. SULLIVAN:

Q Did you have an understanding as to why that proprietary stamp was affixed to the drawings?

A Only in that I understood what the word "proprietary" meant.

Q Did anybody tell you anything about why they were doing it there?

A No.

Q So whatever you know is your own speculation? Nobody told you anything about that?

A Right.

Q Would you describe for the Court the circumstances leading to your leaving Pressure Science, why you left and where did you go?

A I left to return to school at the University of Maryland in February of 1973. I had told my employers that I was going to leave when I first began at Pressure Science, and did so, to return to school.

Q When you left Pressure Science, what was your relationship with Mr. Taylor? Did you see him after you left?

A Yes. I felt then and do now that he was a friend.

Q Do you consider Mr. Taylor a friend of yours today?

A Yes.

Q Have you engaged in any work with Mr. Taylor since you left Pressure Science? If so, what was it?

A Not since I left, no.

Q Any volunteer work?

A Before I left I worked with Mr. Taylor when he set up a youth counseling center in Beltsville for his Rotary Club. That's all.

MR. SULLIVAN: Just one minute, your Honor.

I have nothing further, your Honor.

THE COURT: Cross-examination.

CROSS-EXAMINATION

BY MR. KELLY:

Q Mr. Russell, can you tell us exactly or generally when you were first contacted with respect to possibly appearing as a witness in the lawsuit?

A Approximately three weeks ago.

Q You recall how that contact originated, or who made it?

A I was contacted by someone from Mr. Sullivan's firm, a Miss Deutsch, I believe. I'm not sure of the -- about the -- exactly her name, but that's close. She told me that my name was found out as part of a discovered process and --

Q How many contacts or discussions did you have about your testimony today prior to coming here?

A Four or five.

Q That was over the telephone?

A Yes.

Q Were those with Mr. Sullivan?

A Yes.

Q And --

A And one with Mr. Prout, and that was not over the phone; that was in person. He was in Washington for some other duties he had with his law firm and he came to see me in person.

Q That was at your house?

A Yes, in my apartment.

Q You arrived in New Haven this morning?

A Yes.

Q What time did you arrive, approximately?

A I arrived in New York City at eight o'clock, and we arrived in New Haven at about nine-thirty.

Q Whom did youdiscuss your testimony with, aside from Mr. Sullivan?

A No one.

Q Were others present when you were discussing what your testimony --

A This morning?

Q Yes.

A Yes.

Q Who else was present?

A Mr. Kramer -- not present, as a matter of fact, when we discussed the testimony. Nobody was present when we discussed the testimony this morning.

Q At any time prior to testifying today did you prepare any written notes or questions?

A I did not, no.

Q Were notes prepared at some time?

A I don't -- I don't know whether they were formal notes. Questions were discussed, yes.

Q Who prepared those; do you know?

A Mr. Sullivan.

Q Have you reviewed any notes this morning prior to your testimony here in court?

A I haven't reviewed any notes. We reviewed questions.

Q Let me ask you:

Mr. Sullivan in his questioning was using the term "MCR." When was the first time you heard this term used?

A When Mr. Sullivan used it on the phone.

Q Did you know what it was when he used it?

A After he told me it meant metal C-ring, yes.

Q When you were working at Pressure Science, was part of your responsibility overseeing proprietary markings on documents, shipping those documents to subcontractors or customers? Was that part of your responsibility?

A In the shipping area -- I don't remember this exactly -- I do remember being told that for certain pieces that were going out I was to make sure a proprietary drawing was on the -- a proprietary stamp was on the drawing.

Q Who told you that?

A I don't remember exactly. It would have been either Mr. Phillips or Mr. Sadoff or Mr. Kramer.

Q Are you an engineer in your background?

A No.

Q I am going to ask you a couple of questions. Just see if you can give me a response on this.

Aside from any question in your mind as to whether or not you were at liberty to reveal C-seal process, do you think you would have been competent -- and by that I mean by virtue of having the engineering knowledge -- to go a competitor and to give them essential details of the process?

A I could only explain what I have explained here today. I don't know whether that would be competent or not.

Q Since you have left Pressure Science, which has been a couple of years, some of these things have apparently slipped from your memory, such as the names of sources of supply, details like that?

A Yes.

Q Have you, in fact, ever revealed aspects of the C-seal production process to any competitors of Pressure Science?

A No.

Q You answered a question of Mr. Sullivan that you had not been advised by anyone at Pressure Science that the C-seal process was confidential; is that correct?

A That's correct.

Q Departing from that and setting that aside for a moment, the question of whether you were advised that it was confidential, were there any other indications or impressions you gained from your work there over a period of -- it was about a year, was it?

A Yes.

Q -- through the period of about a year that would have led you to conclude that you would not be at liberty to walk into a competitor and say "I know how to make C-seals and I am willing to set you up"? Had you formed any conclusions on your own, aside from the fact that Mr. Taylor had not come in and sat down and said "This is confidential and you can't reveal it"?

A The only conclusion I had formed on my own was that -- and this is strictly an assumption --

Q Yes.

A -- that everything in the process, the parts, all pieces of machinery, were patented. But that was only an assumption.

Q In other words, am I correct in saying that on the assumption that you formed, which I assume was based on your work and your experience at Pressure Science--you had not had any background in seals before this; had you?

A No, I hadn't.

Q So am I correct in assuming that on your assumption which was formed through your work at Pressure Science it is fair to say that at the time you left Pressure Science you felt that you would not be at liberty to walk into a competitor and say "I can show you how we make C-seals and, you know, for a little consideration, I'll do it"? Is that a fair statement, that you felt some moral or some constraint in your mind, even though Mr. Taylor had not come in and said "This is confidential and you can't reveal it"?

A No, I didn't. I felt that patents completely protected Pressure Science.

Q And you were aware, again from your work with the company during that year, of at least someone on some occasion with respect to some types of parts or sime implements advising you to make sure that they were sent out under a proprietary cover; is that true?

A Would you repeat that again, please?

Q Okay. That was a little bit long.

Also during your year at Pressure Science is it true that someone advised you that with respect to certain parts or drawings that were leaving Pressure Science it was important that they be covered by proprietary stamp?

A I was told that certain drawings must have proprietary stamps on them.

Q Did you have occasion, in your capacity as production expeditor, to go on tours of the plant or to take any customers or any outside people on a tour of the plant?

A I never took anyone on tours, no.

Q Did you see any tours?

A I knew of a tour. I knew that customers -- Rolls Royce Company visited Pressure Science and was taken on a tour. I was not present for the tour. In other words, I did not help conduct the tour.

Q At the time you had determined to leave Pressure Science, this was for the purpose of returning to school; was it?

A Yes, sir.

Q And you are still in school now; is that correct?

A Yes, I am.

Q And you intend to enter law school in the fall?

A Yes, sir.

Q Was there any effort on the part of any employees at Pressure Science to encourage you to stay with the company?

A I was told when I left that there could possibly be a chance for me to move into perhaps sales and that I should consider this.

Q As you think of it now, can you identify any specific people who talked to you, in any way encouraged you to stay on?

A A number of people did. Mr. Taylor did, Mr. Sadoff, Bill Phillips, Mr. Kramer.

Q With respect to Mr. Kramer, he was your immediate boss, wasn't he, during the last portion of your time there?

A Yes.

Q How long had you worked for him?

A Directly --

Q Directly under, as production expeditor.

A The last seven to eight months.

Q What did Mr. Kramer say to you in the line of encouraging you to stay with the company?

A That I should consider staying with the company because it had a good product and it was going to -- it had a good future; the company had a good future.

Q Didn'e he also say that it was the only company that he knew of that was making the V-seal?

A Yes.

Q Please?

A Yes, he did.

Q Did you work for Mr. Kramer four or five months, did you say?

A I worked for him about the last seven or eight months.

Q How often did you communicate with him?

A Daily.

Q Physically, where were you located to him?

A We were both in the same office.

Q Let me ask you to search your memory; and, during this seven- or eight-month period when you were in daily communication with Mr. Kramer and seated right next to him, do you ever recall Mr. Kramer having said with respect to C-seals that he had seen this all before at other places he had worked and that this was nothing special? Did you ever hear him say anything to that effect?

A No, I don't.

Q Please?

A No, I don't.

MR. KELLY: Excuse me, your Honor.

Q Just a couple more questions, Mr. Russell.

With respect to your perception that the C-seal process was somehow protected, whether by a patent or whatever you thought, do you recall specifically anyone talking to you about this?

A I remember the first day I was interviewed for the job of shipping clerk, Mr. Phillips interviewed me; he told me that Pressure Science was the only company in the United States that made this -- this product; and from that I assumed that -- that the process was patented. I knew little bit about patents and figured that was the only way they could be protected.

MR. KELLY: I have no further questions, your Honor.

THE COURT: Redirect.

REDIRECT EXAMINATION

BY MR. SULLIVAN:

Q From the time you left Pressure Science -- when was that?

A February of '73.

Q -- until today, have you ever spoken to or met with David Kramer?

A No.

MR. SULLIVAN: I have nothing further, your Honor.

THE COURT: Anything further?

MR. LaPRADE: Your Honor, I have a question, if you do not mind --

THE COURT: By all means.

MR. LaPRADE: -- in the light of Mr. Sullivan's question.

THE COURT: I do not think you are restricted to that. I am sorry I overlooked you. You can question the witness.

BY MR. LaPRADE: Mr. Ruseell, have you spoken with Mr. Kelly or anybody else at the counsel table about your testimony prior to being here today?

A Not directly about my testimony. I have spoken with them, yes.

Q Who have you spoken with, Mr. --

A Mr. Kelly and Mr. Sadoff.

Q With regard to your assumption -- and I think you said it was only an assumption -- that the process was patented, do I understand you correctly to say that that was based entirely on information given you the first day of your employment, that PSI was the only company making C-seals?

A The assumption was initiated there and was reinforced throughout my year at Pressure Science.

Q With respect to your understanding that the process was protected by a patent, does that mean to you that there is no requirement for secrecy or confidentiality because the patent takes care of that?

A Yes, it does.

MR. LaPRADE: Thank you.

MR. KELLY: No further questions, your Honor.

MR. SULLIVAN: I have none, your Honor.

THE COURT: Mr. Russell, would you refresh your recollection as best you can and see if you can inform me about security at the plant. Directing your attention not to trucks or other things but to the dies, could you tell me a little bit about what happened to a die after it was frayed or became useless? Did you have to account for them? Were they put in a certain place to be regrooved, for example, or did you throw them out in the ashcan? Do you recall any particular duties with respect to the division of the plant that had to do with dies?

THE WITNESS: I remember that when dies became worn through constant use, that efforts were made to recut them or to repolish them so they could be used again. If that was not possible, there was an effort made to use the same piece of metal for different sizes, because it would have different diameters and could therefore be used again. I remember that they were stored by size in the -- in a central storage area beside Inspection. I don't remember anything about destroying dies or throwing them out. I don't remember what happened after a die became totally useless.

THE COURT: Were there any dies that became totally useless?

THE WITNESS: To my knowledge, I don't -- I don't know.

THE COURT: I have no further questions.

You are excused, Mr. Russell. Thank you.

(Witness excused)

MR. SULLIVAN: That is it, finally.

THE COURT: The defendant now rests?

MR. SULLIVAN: That is it for live witnesses. There are a couple of matters that I would like to talk to your Honor about.

First of all, with regard to Advanced Products exhibits, my notes indicate that I have only one exhibit which is still marked for identification, and that exhibit will not be offered as a full exhibit. It is with Mr. Sniegowski's resume. I have it back here. Otherwise, my notes indicate I have offered and all other exhibits have been accepted as full exhibits. To be doubly sure, I reoffer all exhibits except for Exhibit JJ.

THE COURT: My notes I won't represent are any better than yours. I thought all exhibits were introduced.

MR. SULLIVAN: Is that your recollection?

THE COURT: The Clerk would be the official word on it. Do you have any exhibits marked for identification?

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EXCERPT FROM PLAINTIFF'S REBUTTAL TESTIMONY OF BERNARD J. SADOFF, JR.

BERNARD J. SADOFF, JR., called as a rebuttal witness by the plaintiff, having been previously duly sworn, testified in part as follows:

* * * * *

disadvantage of that procedure?

MR. LaPRADE: Objection, your Honor.

A You wouldn't have a --

THE COURT: Overruled.

A (Continuing) You wouldn't have a means of insuring that this wasn't tipped, and without the means of insuring that that wasn't tipped, when you close the die you could get an unequal forming on it. The base provides the means to insure that the part does not get tipped and produce a part such as that.

Q As 84?

A As 84, that's correct.

Q With respect to the expert testimony that was presented by the defendants' expert, I am putting in front of you now three exhibits which are marked CP, CU and CV. I just want to ask you a couple of questions with respect to each of those.

In the first place, I believe it was testified that all of those were made on a progressive die. Is that your understanding?

A That's correct.

Q Is there any special significance to the fact that they were, Exhibits CP, CU and CV, all made on a progressive die?

A The significance is you can't make a C-seal on a progressive die.

Q Each of those exhibits, CP, CU and CV, has a formed portion in the part, and I would like you to look at those and tell me if there is a basic difference in the type of forming found in those three exhibits and in the type of forming which is required to produce a V-seal.

A Yes, there is.

Q And --

A All of the forming.

Q Okay.

A The curved forming --

Q All right. During this phase I wish you would just identify each exhibit and just identify briefly the formed part of it.

A Okay.

On Exhibit CP it's a hinge, and the formed part that was being discussed is the curled portion of this hinge, which comes around.

On Exhibit CU that was an electrical connector. It has a similar curved portion.

On Exhibit CV it was a flint holder on a lighter, and it ends up with a curved portion.

All of these curved portions are cylindrical, and cylindrical forming, to form something in a cylinder, means you are forming a plane. Take this piece of paper, and you form it this way, or this way, in either one of these directions. It's still -- it's a rolled-up plane. There is no tendency for that material to wrinkle because of the fact that it's in a plane.

Now, when we make a C-seal, you take a flat piece of material like this and roll it up in a plane, for which we don't have any wrinkling problems. We don't have to support it or do anything else with it. And I will put a piece of Scotch tape on this piece of paper here to show. Let that Scotch tape represent the weld that we put on the part, and I will now show you that when you are trying to form a C-seal you are not simply doing plane forming; you are forming the metal in two directions simultaneously. You are going to move these edges in like so and move this out at the same time. Now, in order to do that you have to compress some of the material on one side of the neutral axis and you have to stretch it on the other side. And this is what drives it into a wrinkle pattern. You see this edge of the slug, the top and bottom edge. As it comes in it moves to a smaller diameter. There's too much metal there, and so it has to go somewhere, and only a small amount of it can go into thickening the material thickness, itself, smoothly.

So this type of forming in metal forming is considered a drawing operation. It's a two-directional forming. All of the forming in these three exhibits, CP, CU and CV, are simply bending in a plane, and the problems are not in any way analogous.

Q Did you note any example of forming in more than one direction in any of the exhibits introduced by the expert witnesses for Advanced Products?

A Mr. Barton introduced a drapery package cover, which is identified as Exhibit CE, and this is a drawn part in the sense that it started out as a sheet and it was formed in two directions. It's not a simple bend.

Now, on the edge of this part there's a curled edge at the top. The material comes back around. It's very significant to note, and you can do this very readily by laying a straight edge along the inside of this part. There is no return or curve beyond the center line.

I could make a very brief little diagram to show that. Mr. Barton's cup, CE -- here's the bottom of the cup. It comes up. At the top it curls over this way, and then from this point, which -- now I'll change the color from red to black and I will show the balance of it in black -- it comes down at an angle like that. It does not curl

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EXCERPT FROM PLAINTIFF'S REBUTTAL
TESTIMONY OF DUDLEY D. TAYLOR

DUDLEY D. TAYLOR, called as a rebuttal witness by the plaintiff, having been previously duly sworn, testified in part as follows:

• • • • •

A A separate piece, and it would be, you know, like a garter that you would snap around. It snaps inside the U to support the U during the compression process. The one that I have seen was an unpolished seal and silverplated; no polishing was employed.

Q Have you ever seen any evidence that it is marketed in this country?

A None whatsoever.

Q Final question:

Mr. Taylor, during testimony by Mr. Merwin -- and I do not believe you were here when he testified -- my notes show he was testifying about the costs of producing dies to make C-seals, and I believe he stated that after several applications you might get the die cost down to the area of 200 to 300 dollars per die.

I am going to ask you, based on the Pressure Science experience and your knowledge of sizes of orders you get for seals, if you could get a C-seal die for 200 to 300 dollars per die, how would this affect your operation.

A That would be very expensive. We are manufacturing dies in the matter of about four hours' labor, which would give you a die cost of about $60 including the materials.

Now, the exception to that would be a very large die, a die over four inches, something of that sort. The $200 or $300 cost in relationship to a hundred or two hundred dollar order for C-seals would make it a very difficult situation.

Q Is it true that you get a number of orders for under $500?

A Yes, about --

MR. KELLY: I have no further questions, your Honor.

THE COURT: All right, cross-examination.

(A recess was taken.)

THE COURT: You may proceed.

MR. SULLIVAN: Thank you, your Honor.

CROSS-EXAMINATION

BY MR. SULLIVAN:

Q Mr. Taylor, what is the minimum width of the bands that Pressure Science uses to make MCR's? How narrow do they get?

A For the C-seals that we manufacture, the minimum width would be approximately seventy-thousandths minimum width.

Q I am talking minimum width; I am talking from here to here.

A Correct.

* * * * *

Excerpts From Certain Comments for the Record by the Court

On September 16, 1975, at the conclusion of oral argument by the parties, and having reviewed the briefs, the Court made the following comments, in part:

* * * * *

THE COURT: It seems to me that there are two reasons why the Court should comment at this stage of the proceedings. One is, that this case was extremely well tried. The Court has had the benefit of, I suppose, every factual matter that could be presented to it, so I have a very clear view of the facts. Second, the law that we must apply the facts to is not something that would take me days and days to research. Actually, the parties don't disagree on the principles of Law and the guidelines the Court must follow. The crucial thing is applying the facts to the law.

Now, the briefs are comprehensive. The findings of fact will probably run somewhere around three hundred or more. The Court is engaged in a very heavy schedule, criminal jury trials are starting, it will be some time before an opinion can be written, and I think the parties deserve some prelimary impressions of what is in the Court's mind because of those factors. In addition, from a business point of view, I think it is important that somebody puts on the table: "Where is this all going to end? How much is the cost to me? Am I winning a battle and losing a war?"

Now, it is primarily because of these reasons that I would like to state to counsel and their respective clients, who are here in the courtroom, just about where I am on this case. Now, that is not to say I will not change my mind. But

I doubt it. What is left for me is to comply with the rules, to make findings of fact, conclusions of law and to discuss the issues. It is for the parties, after they hear what the Court has to say, to decide whether they wish the Court to write an opinion and then to challenge the bottom line result on appeal, which obviously is going to take time and money, or, perhaps, in view of what the Court says, to sit down and arrive at some amicable settlement.

Counsel, of course, would play an instrumental part in settlement discussions because counsel are more familiar with the chances of an appellate overturn in this type of a case. Right or wrong, it must be assumed that the Court is not going to reach a conclusion based on facts that are not in the record. The conclusion the Court is going to reach will in all probability be based on factual content in the record. But that is for counsel to decide.

There are a great many underlying facts. I am not going to go through them, I am going to get right to the target, right to the heart of the matter.

In capsule form, my thoughts along these lines are: that Mr. Taylor was in the C-seal business. It was a rather selective, small part of the overall business of seals. He developed a system and a process which served him well in his small factory, and was rather successful, but it was in a

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rather limited, select area.

The defendant was in a much broader field with many other competitors in the O-ring business primarily, and the O-ring business was lucrative for the defendant. As time went on there started to be a demand for C-rings, and the defendant met that demand by simply adjusting its equipment to produce a C-ring out of an O-ring. However, as the demand got greater, the defendants, as they should in the business world, started to see a financial horizon with C-seals and decided to produce these C-seals on a much greater basis than they had been in the past. Obviously, the first thing they thought of was: how does the plaintiff do it? They set about to think about that and asked their in-house experts to go to work on it.

I am obsolutely convinced that without Kramer the defendant would not have given up, as Mr. Kelly suggested. The business was too big, it would be foolhardy for businessmen in the O-ring business and partially in the C-ring business to give up and give the entire C-seal business to the plaintiff. But they were having difficulties. I am also firmly convinced that they were scratching their heads as to how this process could be copied or duplicated, and they they got a stroke of luck -- along came Kramer, who worked for Taylor. I suppose the defendants thought that good luck and good fortune came along and saved them an awful lot of time and trouble because they now

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could rely on a man who had had actual experience in the very field that they were having difficulties in.

As far as Mr. Kramer goes, I suppose he was out of a job and he went to where he could get employed -- right or wrong, I form no opinion on that, but I can understand how this came about. He was fired from a 20 or 25 thousand dollar job, talks to the defendant, and they are looking for exactly the type of man that walked through that door. So he took advantage of the opportunity.

On the other side of the coin, there is Mr. Taylor, who feels that his process now has been subject to unfair appropriation by Kramer's action.

It all leads down to this. That of all the items within the process, be it ten, eleven or twelve, however counsel have broken them down in their various briefs, I focus in on the die forming of the slug into the C shape utilizing special dies designed by Pressure Science. That's using the plaintiff's language, and I am sure if I searched through the defendant's brief, I will find mention the die itself in the process. I believe all other items were probably common knowledge and/or that the defendant used a variation of them in their O-ring business -- such as polishing. There is no question in my mind the defendant, even if it knew the plaintiff's way of polishing, would not have adopted it because they had their own equipment with the O-rings. The TIG welding I discount entirely as a trade secret; that is, the defendant would have come up with it in time without any problem at all. It is the die-forming of the slug where I would find the crucial aspect of the trade secret. Now, this is where we get to the business point of view if settlement is to be considered. I would be pleased to write an opinion, I will write it, but I am certainly not going to grant all the relief the plaintiff requests. In other words, what I am saying is, I am in a way finding for both sides: on the one hand, I find there was a trade secret, but on the other hand I certainly don't think it is such that it merits an injunction into perpetuity, or that it merits great damages or that it merits any radical type of relief. In my mind this should make the parties start to consider whether or not they should sit down and maybe iron this case out. I haven't put a time element on the remedy. I reject the five years of Mr. Taylor and I reject the 90 days of Mr. Sommer. I am somewhere in between. I will have to think about that, and maybe it is just as well I have not reached a conclusion on that because the parties may want to think about it for settlement purposes.

But that is where I am. I am sorry if you disagree, but that is how I view the picture. There is something to be said on both sides. I reject the idea that there is nothing here at all that Mr. Taylor should be protected on, and I also reject the idea that everything he did merits protection and give him the exclusive rights to the C-seal business in perpetuity, because I just feel the defendant would have gotten to it sooner or later without Kramer. However, they got help from Kramer and they are going to have to pay something for it. And after they pay for it, however, it's paid for, then the business is wide open for both companies and, probably, many others, too. That is the way I view it.

If you think the Court can be of any aid in following through with counsel and the parties while they are all here today, I would be more than happy to meet with counsel and the parties in view of what I had to say. Speaking to the parties directly, you will, of course, have to confer with your counsel. They will, I believe, quite candidly explain several things to you. One, the odds that the Court is going to change its mind after it reviews the evidence, and, two, if the Court does not change its mind, the odds that, unfortunately, you will be stuck with my ruling. I say the odds are, I didn't say that you will be, because the appellate court will cetainly review this very carefully. But I think counsel will be in a position to weigh what the chances will be, not only that I would change my mind, but whether my opinion will probably be sustained on appeal.

Now, balancing those factors, you have to balance the practical factors: How much is this going to cost you to wait for the Court's opinion, to read it, to get analyses from counsel -- and the time clock is running -- to take an appeal, to write briefs on appeal, to argue the case on appeal, when, in my mind, contrary, I know, to the strong feelings on both sides, this case just doesn't warrant that.

Mr. Taylor had his day in the sun with his exclusive business, but, you know, other people now are coming into it, and he has to face that. On the other side of the fence, the defendants have to realize they did get help from Kramer. Taylor did have something that made things a little easier and much cheaper, and they just have to chalk any settlement off to the cost of business. That's the way I view it.

Again, however this turns out, I must say this was probably, in candor, with one exception, the bank merger case, the most well prepared case that I have had before me in eleven years on the bench. I think the parties on both sides were sincere and acted in good faith. They are businessmen trying to make a living and it is unfortunate they had to end up in a courtroom. I cast no reflection whatever on credibility. I sincerely believe that Mr. Taylor was a credible witness as were Mr. Sommer and Mr. Hostage, as the owners of the respective parties. On the other hand, I do think there is a middle ground, that neither side is absolutely correct. Where that middle ground is I am not sure, but I would be willing to talk to the

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parties about it. If I don't hear from you, I will go to work on this and an opinion should be out just as soon as possible.

Defendants' Exhibit R

DEF. R
15932 EXHIBIT
CASE NO._____TYPE Civ
FULL EXHIBIT ☑
APR 4 1975
FOR IDENTIFICATION ☐
U. S. DISTRICT COURT
DISTRICT OF CONN.

, CONNECTICUT 06473, U.S.A.
09 • Cable: ADVPRODCO

THE ADVANCED PRODUCTS COMPANY

May 31, 1973

M E M O

To: H. R. Sommer
From: Bernie Sniegowski
Subject: General Comments on "C" Seal Forming Methods

In view of our recent meeting on this subject, it may help to collect some random ideas for consideration.

1. There is no question in my mind that we can form "C" seals from hoops at a reasonable cost. The obvious problem to resolve is the selection of the most simple method considering our available equipment and the economics of any new equipment purchases.

2. The available tube for first experiments is 1.00 x.020 wall, 1WC x750 and these introductory plans concern seals in that range. At this stage of planning I feel several techniques will be required depending on seal diameter sizes.

3. Let's analyze the basic "C" shape to agree on some fundamentals. If we assume that the "C" will be an "O" ring shape less 90° of circumference, we can approximate the hoop(before forming) free height as follows:

"O" Diameter	Circumference	APPRX Hoop Height
.062	.196	.145
.094	.294	.221
.125	.392	.294
.187	.589	.442
.250	.785	.589

4. If we begin by planning to roll the edges partially, as discussed, it is apparent we may need male and female roll sets for each hoop height dimension on these 5 sizes.

5. A roll driving device will be required. The Pexto Swivel Roller has some limitations although something now available may be improvised for early experiments.

6. I personally feel a guidance system will be required to maintain centrality during rolling. This problem may not be significant, but it is listed as one in my mind.

/continued

Defendants' Exhibit R

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THE ADVANCED PRODUCTS COMPANY

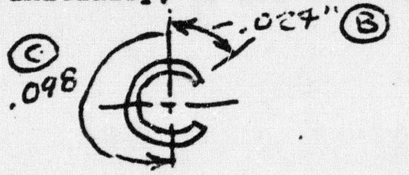
7. The techniques to produce hoops of varying heights must be considered. Early units can be cut from a tube in a lathe utilizing a collet chuck and cut-off bit. This, of course, is limited to small diameters. Large diameters could be formed from strip stock, but we can see the hoop height dimensions are not standard, so the procurement or fabrication of strips must be decided upon.

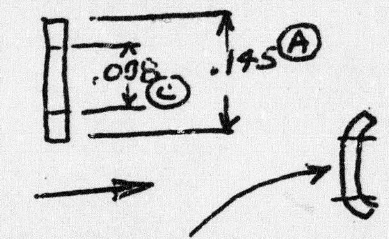
8. Welding of larger diameter hoops from strip must be reviewed. TIG or Plasma has the problem of butt, start, and end craters. We might consider flash butt, but it's probably not a practical solution. Hand filling by weld filler rod is a solution, but costly.
EQUIPMENT ? MAKE OR BUY ??

9. On sizes 6" and smaller, we should consider rubber press forming. This may also be practical up to 12-18" diameter. This would eliminate roll forming development in the early stages, but I agree roll forming would be necessary and possibly the most economical in the long run on all except very small sizes. A review of this concept will follow. PAR 14.

10. On very small sizes (under 1"), it may prove best to use straight matched metal die forming.

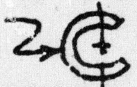
11. Continuing - for our basic agreement let's analyze the "C" further (.062 seal height only): At a hoop height of .145, if we form the lip curves initially, we are discussing a very small circumferential length.





The hoop would ~~not~~ NOW be formed in this manner:

The last operation is to shape the remaining straight hoop into a pure semi-circle:



Alternate routes, as usual, are available:

1. Rubber press forming

2. Straight mechanical compression between flats

3. Same as 2 - into an OD ring to control size

4. Same as 2 - via a metal die set split but 1/2 C top and bottom. See my layouts # and # for further details.

/continued

Defendants' Exhibit R

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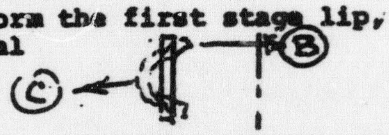
12. As the hoop free height increases, the magnitude of the "C" segments increases, but it is worth noting just how small the segments are:

	(A)	(B)	(C)
.062	.145	.024	.098
.094	.221	.037	.147
.125	.294	.049	.196
.187	.442	.073	.299
.250	.589	.097	.392

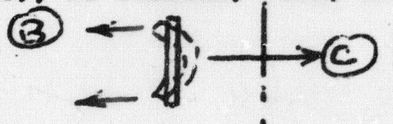
13. The metal flow behavior for OD and ID seals, particularly on smaller sizes, is different and must be analyzed:

(a) ID - "C" - From a basic hoop, to form the first stage lip, we essentially must shrink the metal

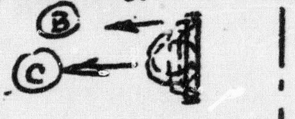


and then to form the semi-circle (c), we stretch, form, and bend.

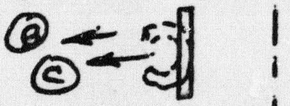
(b) OD - "C" - Conversely



(c) And by an alternate method on small diameters, we could move the metal solely by stretch, forming, and bending into an ID - "C".



(d) Similarly, we could move B and C by stretch forming and bending into an OD - "C".



14. I have prepared a completed plan to start with rubber press forming of the first stage lip. We could then explore the aspects of Para. 11 - 2, 3, or 4. My calculations show that, theoretically, we could use our compression tester for small sizes. This RPF method would be limited to ID - "C"'s. It's my opinion that less shop

/continued

Defendants' Exhibit R

effort is required with this approach. We could delay roll forming development to a later phase.

15. If you elect to begin fabrication of an OD-"C" simultaneously with the above, we could, with fairly limited shop effort, commence with straight mechanical, matched metal die method as well. Alternatively, MMD's could be the limited first phase of work, in preference to (14).

16. The purchase of tubing for small diameter seals will be very difficult. To find stock tube which will match the seal diameter requirements precisely will be rare. In some cases this can be possible; however, if a full scale production program is initiated, we will require a capability to weld tubes of varying sizes. On small size tubes this is not a simple task. An alternate approach is to draw from small-medium diameter cylinders and eliminate the welding completely. This still leaves us with the need to weld hoops, either from strips, or for multiple seals cut from wider bands.

17. Conclusion and Summary

Assuming we have agreed to go with the 1" tube on hand, we must decide:

A. OD or ID, or both , ALSO SIZE-12 (.062,.094 OR .125)?

B. Roll form of first stage lip or RPF and MMD, or both

C. With a decision on A and B, Para. 11-2, 3, and 4 would easily be made.

D. Roll forming development program should be formulated and agreement on priority, i.e., Phase I or Phase II

E. Wall thickness of experimental tube must be decided, i.e., use as is or rework to .015" and/or .010"

F. I'll have layouts and preliminary sketches ready by ~~Friday~~ MON noon for a meeting at your convenience.

BJS/mmn

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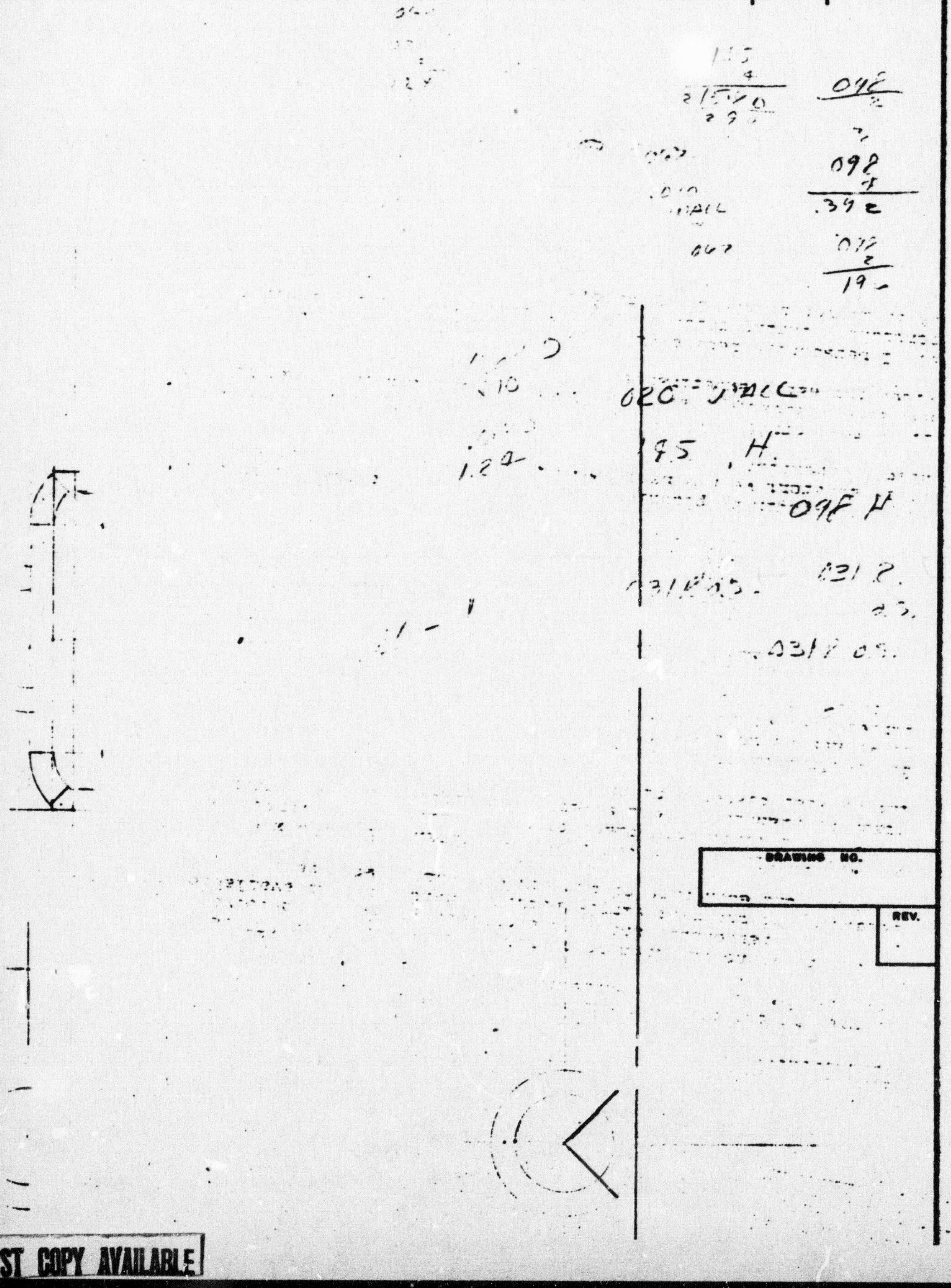
REVISIONS			
LTR.	DESCRIPTION	DATE	APPROVED


098
.098
.392
.098
19
.020 WALL
1.20
.195 H
.098 H
.031 R 05
.031 R
.031 R 05
DRAWING NO.
REV.

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by means of the knock-out pad *F*. Rod *G* forces the shell from the punch in case it sticks.

Combination Die for Curled Ring.—Fig. 16 shows a punch and die used for the production of a gasket ring *R* for a combination zinc and cork gasket. This gasket consists of a ring of thin sheet zinc into which is forced, in a later operation, a ring of compressed cork. The die consists of the following parts: The die-holder *A*; the cutting die *B*, which is screwed and doweled to the top of block *A*; the upper stripper ring *C*, which slides freely in a recess in block *A*; the drawing ring *D*, which is screwed to *A*; the inner stripper ring *E*, which slides freely in drawing ring *D*; and the push-rods *F*, which bear against the usual spring and plate below the bolster of the press. The top of the die is covered by a stripper plate (not shown). The punch consists of the punch body *G*, the large cutting and forming punch *H*, the small piercing punch *I*, four stripper-pins *J*, stripper-pin springs *K*, and the pilot *L*, set in the punch *H*.

When the die is in operation, the stock is fed under the stripper by the roll feed of the press, and the punch *I* pierces the central opening of what is later to be the ring that forms the gasket shell. On the next stroke of the press the pilot *L* enters the hole pierced by punch *I* and locates the stock for the cutting punch *H*. After punch *H* has cut the ring for the shell, it carries it down, still guided by pilot *L*, until the ring is grasped between the face of punch *H* and the outer and inner pressure rings *C* and *E*. As the press ram continues downward, the pressure rings *C* and *E* are carried down by the action of the punch, and the stock is drawn over the forming ring *D*, the pressure of rings *C* and *E* preventing wrinkling. On the return stroke of the press, rings *C* and *E* strip the shell from the forming ring *D*, while the stripper pins *J* prevent the shell from sticking in the recess of the forming punch *H*. It is necessary to use the stripper pins *J*, because since the shell surrounds the central portion of punch *H*, there must be some positive means of ejecting it from the groove.

In setting up this set of tools, it was found necessary to adjust the inner pressure ring *E* a little tighter than the outer pressure ring *C*, as the smaller surface of the inner ring allowed the stock to be drawn from under it more readily, which resulted in the inner edge of the shell being lower than the outer edge. This could have been avoided by finding the blank diameter experimentally, but as the job was one on which a very short time for making the tools had been allowed, it was necessary to compute the diameters of the blank and make up the tools without stopping to find the diameter by the usual methods.

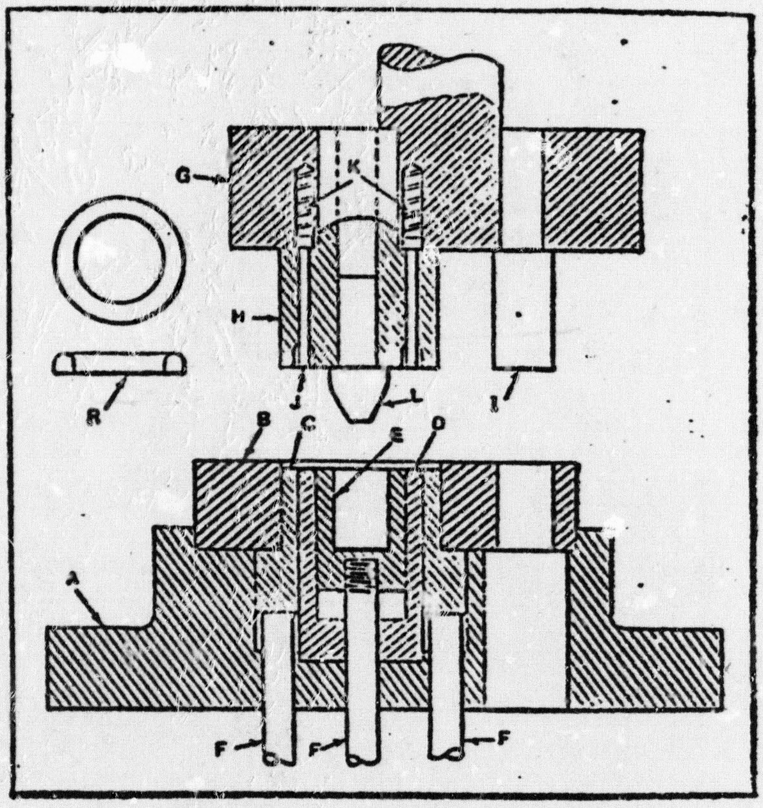

Fig. 16. Die for Blanking and Drawing Gasket Rings

Three sets of these tools were made for gaskets, having inside diameters of 3/4, 1 1/2, and 2 inches respectively, all of

No return.

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which were entirely satisfactory in operation. Owing to the fact that the stock was 0.012 inch soft zinc, the punch *H* was left unhardened, and was sharpened when necessary by peening out the outer edge and shaving it into the die *B*. The edges of the recess in the punch *H* were rounded to a radius of 1/32 inch, to prevent the tearing of the stock in the drawing operation.

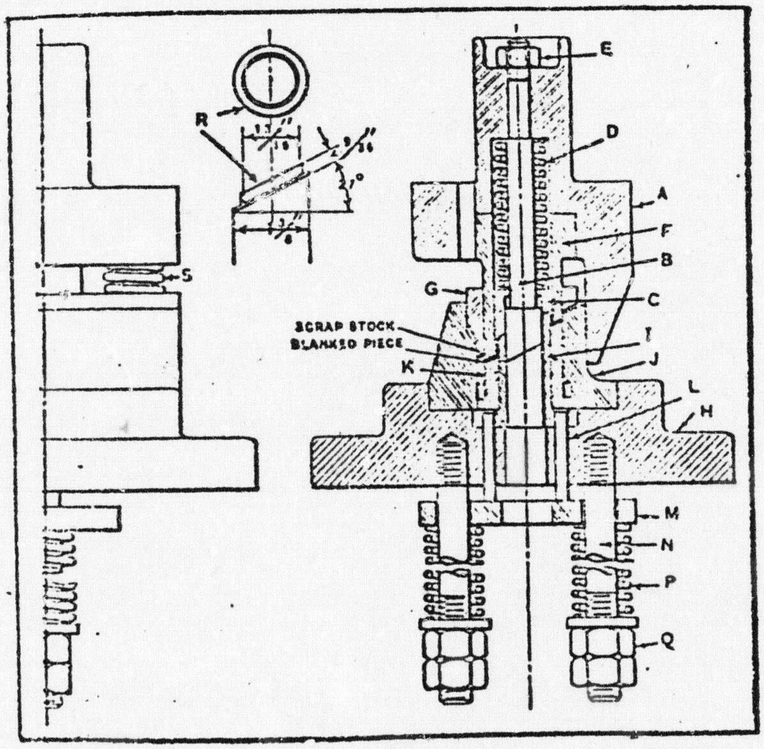

Fig. 17. Combination Die for Piercing, Flanging and Blanking Sheet-metal Collar

Combination Die for Flanged Collar.—The combination die shown in Fig. 17 is designed to pierce, flange, and blank the collar of angular design shown at *R*. This collar, which is of rather an unusual shape, forms part of the gasoline tank of a motorcycle. It is made from strip tin stock, 1 9/16 inches wide and 0.020 inch thick, which is fed through the die at

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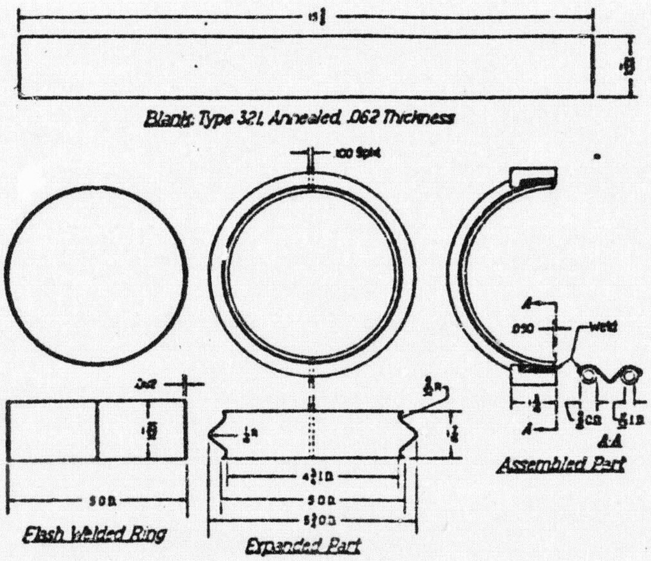
Blank: Type 321, Annealed, .062 Thickness
100 Split
.090
Weld
A
A-A
Assembled Part
Flash Welded Ring
Expanded Part
5.0D
4 1/4 ID
5 3/4 OD

Figure IV-44. Fabricating a half-circular stainless-steel section from a welded ring. (*Courtesy International Nickel Co.*)

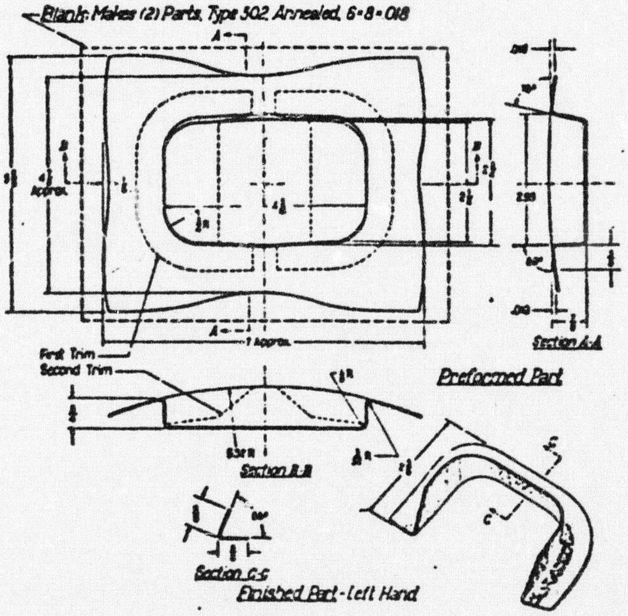
Blank: Makes (2) Parts, Type 302, Annealed, 6 × 8 × .018
A
B
4 1/2 Approx.
7 Approx.
2.50
First Trim
Second Trim
Section A-A
Preformed Part
Section B-B
Section C-C
Finished Part - Left Hand

Figure IV-45. Press-die forming a stretch-flanged, stainless-steel part from a rough

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press-die formed by expanding (bulging) methods (Figure IV-44). The blank for such a part consists of a ring cut from tubing or flash welded from a strip of developed length and width. This ring is then expanded to contour by means of a collapsible die, as described in detail in Chapter IV-3. Two operations, between which the part is rotated in the die, are required to finish form the contour over the entire circumference, as the first operation leaves the metal unformed around the gaps of the expanding punch.

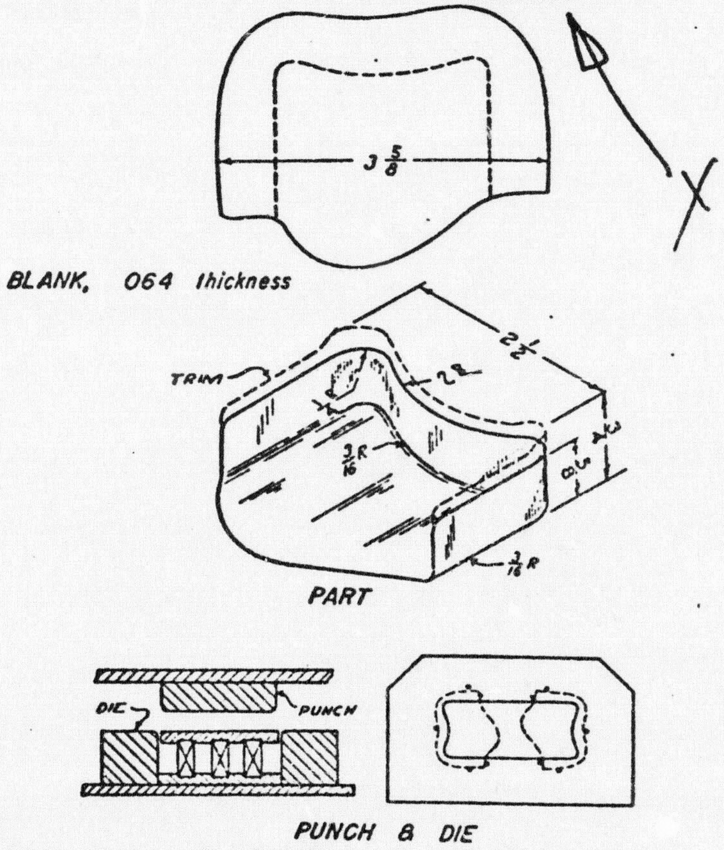

Figure IV-46. Aluminum-alloy (24S-O) part with contoured flanges die formed from a rough blank.

Die Forming Contoured Flanged Parts and Curved Sections from Rough Blanks

Contoured flanged parts, as well as short, curved sections which cannot be produced without excessive difficulties from developed blanks, are generally cut from double-action die-formed parts.

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the bottom or punch-nose radii in much the same manner as discussed in Chapter III-1 for cylindrical cups. These contour radii should be at least five times, and preferably eight to ten times, the metal thickness if a part of maximum depth is desired.

Parts whose depth exceeds the single-operation limit can be produced by one of several distinctly different techinques. If the depth of the part is not much larger than this limit, the part can be gradually developed in depth and the radii can be gradually sharpened with dies and punches of otherwise the same contour (Figure IV-49). If the die radii are sufficiently large, therefore, the same die can be used. Punches for the various operations should possess approximately the same nose area, but vary in taper corresponding to the progressively developed shape. The first drawing operation should not exceed a depth of 35 per cent of the minimum punch-nose dimension, that is, the diameter of the nose of a round punch or the width of a rectangular punch.

The generally accepted method of forming a very deep part with sloping walls (Figure IV-53), however, is to form first a stepped part with vertical walls by cupping and redrawing, as discussed in Chapters II-1 and II-2. This part should outline approximately the final contour of the part, but the surface of the recess should be slightly smaller than that of the desired part. Finally the preformed, stepped part is transformed into the desired part with sloping walls by stretching rather than by shrinking. If the part is rather deep and deviates only slightly from a part with vertical walls, it may be possible, during the finish forming operation, to combine the tapering with a certain reduction at the bottom (Figure IV-54).

Die Forming Undercut and Expanded Parts

Parts which cannot be removed from a regular punch may be designated as undercut. The fabricating of such parts generally consists of at least two operations: the forming of the part to a contour close to its final shape, but conforming to one of the common part types; and the reforming of this part to the undercut contour.

A variety of special devices and processes are used to form undercut parts. One of the most universal is the use of a wedge-action die, also called a "cam die", which transforms the vertical motion of the press into one or more horizontal motions by means of wedge-shaped projections on the upper and lower dies (Figure IV-9). Cam dies also serve to form closed contours which may be considered as a special form of undercut contours.

Another very common undercut part type possesses rotational symmetry. Such parts are generally produced from deep-recessed parts or from tubular sections by either expanding or reducing the diameter of all or a portion

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of its cylindrical length. Such expanding and reducing operations serve to form numerous special contours (Figure IV-55). These can be obtained by special measures incorporated in die forming or by spinning, as well as by special-purpose methods which use roller-type tools and are related to spinning. The latter applies to flanging and other edge-reforming operations, such as flaring, curling, wiring, and seaming, and also to external and internal beading, finning, threading, rolling, and knurling.

Certain reducing operations, applied to the ends of cylindrical parts, belong to the group of deep-drawing processes and were discussed in Chapter III-2. Such operations are tapering, necking, nosing, and closing.

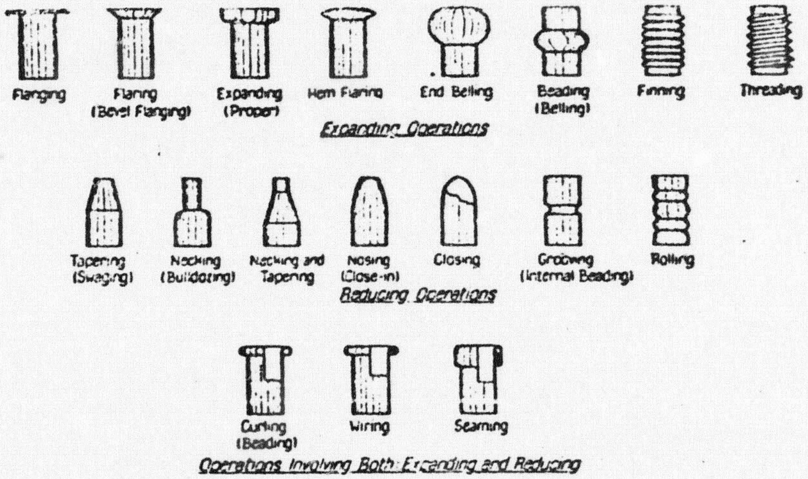
Flanging
Flaring (Bevel Flanging)
Expanding (Proper)
Hem Flaring
End Belling
Beading (Belling)
Finning
Threading
Expanding Operations
Tapering (Swaging)
Necking (Bulldozing)
Necking and Tapering
Nosing (Close-in)
Closing
Grooving (Internal Beading)
Rolling
Reducing Operations
Curling (Beading)
Wiring
Seaming
Operations Involving Both Expanding and Reducing

Figure IV-55. Various expanding and reducing operations on tubular parts. (*Courtesy International Nickel Co.*)

Beading and flaring can be performed in a particularly simple manner by utilizing the tendency of a tubular section to buckle under longitudinal compression. The proper contour is obtained by allowing the buckle to form into a correspondingly shaped recess, while the inside is prevented from distortion by a close-fitting mandrel.

The necessity of clamping the tubular section in expanding operations and the unintended distortion of this section during the forming of the contour renders difficult the removal or ejection of any but parts with very short cylindrical sections from solid dies. In many expanding and reducing operations, therefore, split dies consisting of two or more movable segments are used to obtain the outside contour even if the formed part would permit removal from a solid die. Parts with a reverse longitudinal contour naturally

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thickness, if not related to the tube diameter, is a meaningless measure. For instance, a tube wall 0.020 in. thick would be a standard wall for a tube of ½-in. OD. But for a 6-in. tube it would be a very thin wall. The centerline radii given in Table 5 for bending tubing of various *D/t* ratios with a ball mandrel and a wiper die are conservative and often are exceeded.

Table 5. Average Practical Centerline Radii for Bending of Thin-Wall Steel Tubing Using a Ball Mandrel and Wiper Die

Tubing OD, in.	Average centerline radii, in., for tubing with wall thickness, in., of:					
	0.035	0.049	0.065	0.083	0.095	0.120
½	½(a)	½(a)	...	...	...	...
⅝	⅝(a)	⅝(a)	...	...	...	...
¾	¾	¾(a)	¾(a)	...	...	...
⅞	1¼	1⅛	1(a)	...	...	...
1	1½	1¼	1⅛	1⅛(a)	...	...
1⅛	2½	2	1¾	1½	...	...
1¼	3½	3½	3	2½	2	...
1½	5	4½	3¾	3¼	2¾	2¼
2	9	8	7	6	5	3½
2¼	12	10½	9½	8	6½	5
3	18	13	11	10	9	8

(a) No wiper die required

chines used to bend thin-wall tubing have a greater capacity than is necessary, so that they will be stable and rigid. Their bending action must be smooth and steady. Runout on machine spindles should not exceed 0.0005 in. Mandrel rods must be heavy enough that they do not stretch or buckle when the slip-fitting mandrel is inserted into the tubing.

Auxiliary equipment includes: means for pressurizing the tubes with air or hydraulic oil (hydrostatic mandrel) to keep them from necking after they are drawn past the last mandrel ball; hydraulic feed on pressure dies to hold tubes in compression; and mandrel oscillators that move the mandrel back and forth to keep the tubes from necking down. Amplitude of mandrel oscillation can be adjusted from ⅛ to 1 in., and frequency, from 1 to 500 cpm.

Tools must be more accurately made than for bending standard tubes. The form block or bending die should have a runout at the bottom of the groove of not more than 0.001 in. The depth of the groove should equal 55% of the outside diameter of the tube. The width of the groove should equal the outside diameter of the tube plus 10% of the wall thickness. The width of the clamping groove on the bending die should equal the outside diameter of the tube minus 10% of the wall thickness. The length of the clamping groove should be five to six times the outside diameter of the tube unless special clamping provisions like flaring or clamping cleats are included. The clamp and the bending die can be keyed or doweled for perfect alignment. Clamping plugs are sometimes used; these either should be slip fitted in the tube or should be expandable.

The pressure die should have a groove wider than the tube outside diameter by an amount equal to 15% of the wall thickness. The width should not vary from end to end by more than 0.0005 in. Variation in the groove will cause a pinching or relieving effect. If all tools are properly adjusted, only

die, which can be adjusted against a solid bar with the same diameter as the outside diameter of the tube.

The wiper die has a groove of width equal to the outside diameter of the tube plus 10% of the wall thickness. The groove should be highly polished and have a thin coat of light oil. Too much or too heavy oil will cause wrinkles. The groove must be a full half-circle in cross section to support the whole inner half of the tube. The groove must also fit closely to the form die for at least 15° back of the point of bend so that it cannot be forced away by the pressure buildup of the compressed inner wall of the bend. Failure to maintain the position of the wiper die can cause wrinkles.

Mandrels used with thin-wall tubes are generally multiball mandrels. They have a clearance no greater than 10% of the wall thickness of the tube. The mandrel must be positioned very carefully so that the full diameter of the body is just at the start of the bend (first ball of cable or ball-socket mandrels at the bend tangent). A template should be used to set the mandrel. If auxiliary oil or air pressure in the tube is not used, there must be enough balls to reach completely around the bend.

Interlock tooling is sometimes used for bending thin-wall tubes. The clamp is keyed to the form block; the wiper die is locked to the pressure die; and the pressure die is locked into alignment with the form block. Interlock tooling was developed specifically for automatic bending, but it has some advantages in general bending. The tools will not crush the work nor mark it; setup time and scrap can be reduced.

Material should be especially uniform in thin-wall tubing to be bent, and should all be from the same source — preferably from the same heat. Because tooling dimensions are held closely, close-tolerance tubing is recommended, in spite of its added cost.

Production Examples. Thin-wall tubing is frequently bent to elbows that have a centerline radius equal to the diameter, and it is not uncommon for the diameter to be as much as 90 times greater than the wall thickness (for instance, a 6-in.-diam tube with an 0.065-in.-thick wall). Many such elbows are used in vacuum-line service, where no wrinkles are permitted. They are commonly made from 1020 steel tubing in the as-received condition. Bends are made using ball mandrels and wiper dies, and an oil-base lubricant. Some manufacturers of elbows use chromium-plated tools to minimize tool wear.

It is often difficult to prevent thin-wall tubing from slipping during bending. Methods used to provide adequate clamping are described in the next examples:

Examples 398 and 399. Procedures to Prevent Slipping of Tubes During Bending

Example 398 — Tube for Hydraulic Circuit (Fig. 15). The tube shown in Fig. 15 was used in a high-pressure hydraulic circuit of an earthmover. Five bends, ranging from approximately 20° to 86°, were made in a powered compression bender. All bends were made on a 6-in. centerline radius.

The 86° bend posed a problem because only 5 in. of tube was available for clamping during bending, causing unacceptable bends. The first approach was to line the clamps with emery cloth, but this did not add enough friction to prevent slipping. A second approach was to increase the force on the clamp. Until a hydraulic cylinder could be installed to provide this force, a factory lift truck was used. Acceptable bends were produced by increasing force on the pressure die.

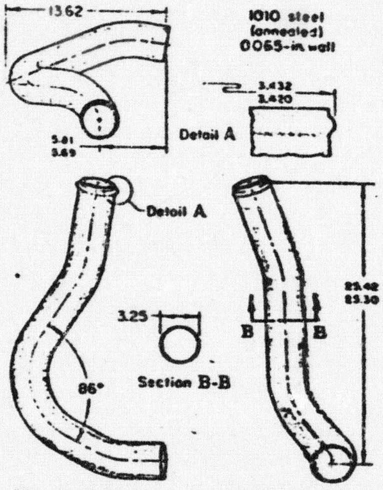
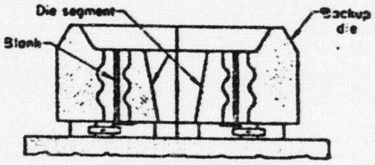
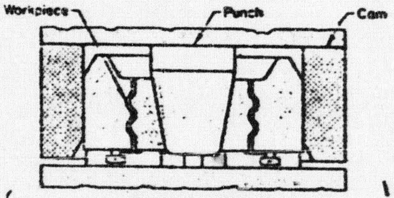


Fig. 15. Component of a hydraulic system that required five bends (Example 398)



Loading position



Forming position

Fig. 16. Use of segmented dies for expanding a section of tubing in a press

The tubing had a phosphate coating. A three-ball mandrel with an oil hole provided a constant supply of lubricant (a mixture of lard oil and mineral oil) to the inside of the tube. Tools were of W1 or W2 tool steel, hardened.

Example 399 — A 90° Bend. A smooth 90° bend was to be made in the center of a 12-in.-long tube. This tube was 2¼ in. in OD and had a wall thickness of 0.048 in. It was made from seam-welded low-carbon steel. Centerline radius of the bend was 4½ in.

In conventional bending, the tubes slipped, resulting in unacceptable marking of the workpieces. The first attempt to solve the problem involved threading the clamping surfaces of the tools. This prevented slipping, but the threads marked the tubes. A second approach was to bore shallow grooves in the clamping surfaces to provide a series of flat-ring surfaces. The grooves, ⅛ in. wide by

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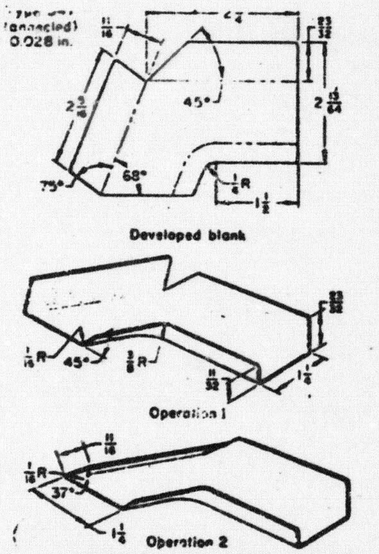
Type 301 (annealed) 0.028 in.
45°
75°
68°
Developed blank
45°
Operation 1
37°
Operation 2

Fig. 9. Mounting channel with a stretch flange and bends in two directions that was formed in two operations in a press brake (Example 456)

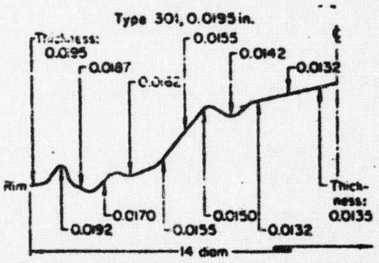
Type 301, 0.0195 in.
Thickness: 0.0195
0.0187
0.0162
0.0155
0.0142
0.0132
Rim
0.0192
0.0170
0.0155
0.0150
0.0132
Thickness: 0.0135
14 diam

Fig. 10. Profile of a press formed automobile wheel cover showing thinning purposely produced by severe stretching

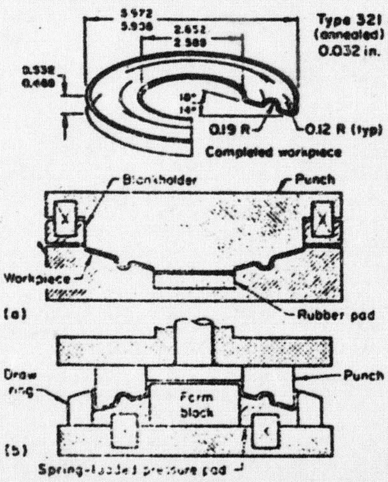
3.972
3.936
2.652
2.588
Type 321 (annealed) 0.032 in.
0.538
0.468
18°
14°
0.19 R
0.12 R (typ)
Completed workpiece
Blankholder
Punch
Workpiece
(a)
Rubber pad
Draw ring
Form block
Punch
(b)
Spring-loaded pressure pad

Fig. 11. Severe forming of an austenitic stainless steel aircraft-muffler header, to produce work hardening that would increase the rigidity and fatigue strength of the part (Example 457)

shock resistance of tool steels and aluminum bronze. Tool steels such as D2 are preferred when resistance to both shock and wear is required.

Aluminum bronze offers the most protection against galling and scuffing of the workpiece. An oil-hardening tool steel such as O2 can be used for short production runs.

Austenitic Alloys. Workpieces can be stretched by applying high blankholder pressures to the flange areas to prevent metal from flowing into the die. This causes severe thinning, but work hardening may cause the thinned metal to be as strong as or stronger than the thicker unworked sections. Figure 10 shows a section of an automobile wheel cover, made of type 301 stainless steel, in which the central portion was purposely thinned and work hardened by stretching.

In the application described in the example that follows, one of the principal reasons for stressing the workpiece to the limits of formability was to work harden it for increased strength.

Example 457. Severe Forming for Intentional Work Hardening (Fig. 11)

The material for a muffler header (Fig. 11) for a small aircraft engine was intentionally stressed nearly to the limits of formability, to increase rigidity and give it the necessary fatigue strength. The headers were made in two operations in a 60-ton open-back-inclinable mechanical press having a 5-in. stroke. Each operation used a tool steel die, hardened to Rockwell C 59 to 62. Production was 400 pieces per month.

The first die (Fig. 11a) was a compound die that formed the dish of the part, formed the bead in the dish, and blanked the inside and outside diameters. The blankholder at the outer edge of the workpiece was spring loaded, and a rubber pad supported the inner surface of the workpiece against the center blanking punch. The sequence was programed so that the forming was completed before the outside and inside diameters were blanked, thus making the flange dimensions more accurate and concentric than would have been possible otherwise. Die life was approximately 20,000 pieces.

The second die (Fig. 11b) formed both the inner (stretch) flange, and the outer (compression) flange. A spring-loaded pressure pad maintained correct gripping pressure against the muffler-header body during this operation.

The blank was annealed type 321 stainless steel, 0.032 in. thick, sheared to 8½ in. square. The bead formed in the first die was used as a locating surface in the second die. The dies were brushed with oil between pieces.

The production rate for both operations was seven pieces per minute; at $8 per hour, the labor cost was nearly $0.02 per piece. Setup time for the first operation was 0.17 hr, and 0.31 hr for the second operation.

Stainless steel has high ductility but wrinkles easily in compression. Therefore, if there is a choice in direction of metal flow during forming, a better part is likely to be produced by stretching than by compression, as in the following example.

Example 458. Use of Clamping Plates and Bead to Control Metal Flow (Fig. 12)

The dome section shown in Fig. 12 was formed from a tapered blank of annealed type 302 stainless steel in a 250-ton double-action hydraulic press. It was desirable to maximize metal flow from the narrow end of the blank in order to cause stretching rather than contraction in the metal and thus avoid wrinkles.

The dies could not be oriented to let the blank lie flat, because of the necessity for forming the re-entrant angle next to the lower clamping plates. Both the upper and the lower edges of the blank were held between steel plates during forming. Clamping force on each pair of plates was 36 tons. Since the upper plates were twice as long as the lower and two-thirds as wide, the clamping force was distributed over a larger area and could have permitted the major part of the metal flow from the larger end, with attendant wrinkling of the work metal. Addition of a bead to the upper clamping plates improved holding at that end and caused the major part of the metal flow to occur at the small end of the blank. The application of a fatty-acid-type, nonpigmented drawing compound to the lower plates further encouraged metal flow from the small end of the blank.

Scrap loss because of tearing over the relatively sharp lower die radius was 3%.

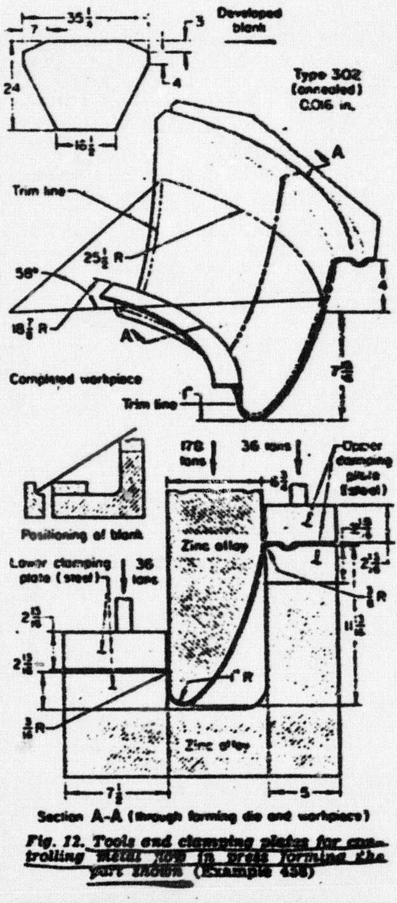
35¼
7
3
Developed blank
24
4
16½
Type 302 (annealed) 0.016 in.
A
Trim line
25½ R
58°
18⅞ R
A
Completed workpiece
7⅜
Trim line
176 tons
36 tons
Upper clamping plate (steel)
Positioning of blank
Zinc alloy
Lower clamping plate (steel)
36 tons
R
R
R
Zinc alloy
7½
5
Section A-A (through forming die and workpiece)

Fig. 12. Tools and clamping plates for controlling metal flow in press forming the part shown (Example 458)

Ferritic Alloys. The formability of ferritic stainless steels, particularly the higher-chromium types, can be improved by warm forming at 250 to 400 F, rather than cold forming. The metal is more ductile at the higher temperatures, and less power is needed in forming. Some pieces that cannot be made by cold forming can be made successfully by warm forming.

Lubrication. The lubricant used most often in press forming of stainless steel is the chlorinated type. It has unexcelled chemical EP activity; and the ability to adjust this activity and viscosity independently over an extremely wide range makes it the most versatile lubricant for this purpose. All chlorinated lubricants are readily removable

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efractory Metals

*By the ASM Committee on Forming of Heat-Resisting Alloys**

REFRA ly workec tion rate: died sep process is

Table 1 fractory : cal condi to 0.050 i Tensile f materials are summarized in Table 3.

Formability

Columbium and tantalum alloys generally are formed at room temperature in the annealed (recrystallized) condition, although the stress-relieved alloys are sufficiently ductile for most forming operations. Work hardening, especially of the stronger alloys, often necessitates annealing after severe forming.

Strong alloys of columbium, which are made in limited quantity, are not listed in Table 1. These alloys have varying degrees of brittleness at low temperature, but can be formed by the same procedures used for molybdenum.

Molybdenum and tungsten are more difficult to form than columbium and tantalum, but if they are heated and certain precautions are taken, even complex parts can be formed. The greatest difficulty in forming these metals is their tendency toward brittle fracture (cracks and ruptures that occur with little or no plastic deformation), and delamination (a type of brittle behavior that produces cracks or ruptures parallel to the plane of the sheet). Tungsten can be hot formed only; it is brittle at room temperature.

At slow strain rates in tension and in bending, molybdenum, Mo-0.5Ti and TZM are ductile at room temperature, becoming brittle at lower temperatures. However, because of the high variable strain rates and tri-axial stresses in the usual forming processes, these metals are usually hot formed, to decrease the probability of brittle fracture. Molybdenum and tungsten blanks must have prepared edges to prevent cracking and splitting during forming.

Molybdenum and tungsten are generally stress relieved before forming. Recrystallization raises the transition (ductile-to-brittle failure) temperature.

Effect of Composition

Columbium and tantalum are severely embrittled by oxygen, nitrogen and hydrogen, even in minute amounts. However, the usual melting and processing techniques keep the metals pure enough for good formability.

Some of the columbium alloys are more resistant to grain growth at high temperature than high-purity columbium. Alloys such as FS-80, Cb-752 and Cb-753 are high-strength materials that resist grain growth at high-temperature. These alloys have fine grain and elongate uniformly for forming and drawing operations.

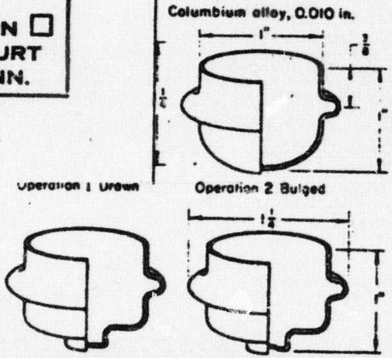

Fig. 1. Deep drawing, bulging and piercing columbium alloy sheet in four operations (Example 505)

The advantage of using a less pure material instead of high-purity columbium sheet for deep drawing, is shown in the following example.

Example 505. Change From High-Purity to Lower-Purity Columbium (Fig. 1)

A formed shell was produced from 0.010-in.-thick columbium sheet in four operations, as shown in Fig. 1. The operations were: draw cup, bulge sides, draw bottom into a smaller cup, pierce the smaller cup. The lubricant was a mixture of graphite and oil.

When high-purity columbium (200 parts per million oxygen) was used, the bottom of the cup tore during the second drawing operation, with localized necking and ductile failure. Failure was caused by low work-hardening characteristics and low uniform elongation in tension. Sheet of lower purity (columbium with 900 parts per million oxygen) was substituted to obtain better drawing characteristics. The lower-purity sheet was harder, of finer grain, more ductile, and stronger than the original material.

Surface Contamination

The most common causes of surface contamination are failure to clean the surface properly and failure to provide the proper atmosphere in heat treatment. Columbium and tantalum are usually acid pickled, and are heat treated in a vacuum or an inert-gas atmosphere. (For details of heat treating refractory metals, see page 267 in Volume 2 of this Handbook.)

Generally, the high-strength alloys are more severely embrittled by surface contamination than are the lower-strength alloys.

Molybdenum and tungsten are much less susceptible to surface contamination by oxygen and nitrogen than are columbium and tantalum. Pure dry hydrogen does not affect molybdenum or tungsten; however, stress-relieving of molybdenum alloys in an atmosphere of cracked ammonia (an atmosphere containing both hydrogen and nitrogen) may contaminate the surface, and this contamination must be removed by grinding or pickling. Molybdenum and tungsten are cleaned in an acid pickling bath or a caustic solution, and then heat treated in dry hydrogen.

Factors That Affect Mechanical Properties

Major variables that affect mechanical properties and formability are working temperature, temperature of anneals between operations, percentage

Table 1. Nominal Compositions of Refractory Alloys Available as Sheet(a)

Alloy	Zr	Ti	V or Hf	W	Others
Columbium-Base Alloys					
FS-80	1.0	...	...	...	...
FS-82	1.0	...	...	...	33.0 Ta
FS-85	1.0	...	...	11.0	28.0 Ta
C-103	...	1.0	10.0 Hf	...	
C-129Y	...	...	10.0 Hf	10.0	0.10 Y
B-66	1.0	...	5.0 V	...	5.0 Mo
D-14	5.0	...	...	...	...
D-36	5.0	10.0	...	...	...
D-43	1.0	...	...	10.0	0.10 C
Cb-752	2.5	...	...	10.0	...
Cb-753	1.2	...	5.0 V	...	...
Tantalum-Base Alloys					
Ta-10W	...	...	...	10.0	...
Ta-8W-2Hf	...	...	2.0 Hf	8.0	...
Ta-30Cb-7.5V	...	...	7.5 V	...	30.0 Cb
Molybdenum-Base Alloys					
Mo-0.5Ti	...	0.5	...	...	0.03 C
TZM	0.1	0.5	...	...	0.03 C

(a) Commercially pure Cb, Ta, Mo and W sheets are also available.

Table 2. Conditions for Press-Brake Forming of Refractory Metal Sheet 0.020 to 0.050 in. Thick(a)

Metal or alloy(b)	Forming temperature	Minimum bend radius(c) — Test data	Minimum bend radius(c) — Preferred	[illegible]
Columbium-Base Alloys (Annealed)				
FS-82, C-103, C-129Y	Room	<1t	1t	3°-6°
D-36	Room	1t-2t	2t	3°-[illegible]
Tantalum-Base Alloys (Annealed)				
Tantalum	Room	<1t	1t	
Ta-10W	Room	<1t	2t	3°-[illegible]
Molybdenum-Base Alloys (Stress Relieved)				
Mo-0.5Ti, TZM	300 F	2t-5t	5t	3°-[illegible]
Tungsten (Stress Relieved)				
Tungsten	600 F	2t-5t	5t	3°-[illegible]

(a) Formed to a 120° bend angle V-die at a ram speed of 10 to 120 Table 1 for compositions. (c) sheet

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*For committee list, see page 371.

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proprietary compound based on a medium-weight mineral oil. Production rate was three pieces per hour; each piece required 15 min for setup and 5 min for fabrication. Total quantity produced was [illegible] pieces. Tooling cost was approximately $3000.

An alternative method considered for the production of this tube was hydraulic forming, but this was ruled out, because of high die costs and the localized forming required. Another alternative method was to form the expanded portion by drawing and then to weld it to the tube, but the weld area could not be consistently finished to quality requirements.

Each of the two parts discussed in the following example would normally be produced as a welded assembly of two drawn pieces, but each was made in one piece by EHF.

Example 549. Use of EHF That Eliminated Welding in the Production of Tubular Parts (Fig. 47)

Originally, the offset tube shown in Fig. 47 was made by drawing two longitudinal sections with an outside diameter of 3½ in. and welding the sections together, and the in-line stepped tube also shown in Fig. 47 was made by welding sections of 2-in. and 2.75-in. diameter to a preformed transition ring.

The two tubes were produced more economically as one-piece units by electrohydraulic forming. Production costs were reduced by eliminating trimming, welding, and grinding of welds. Dimensional variation was reduced and surface finish was improved.

Certain types of parts can be made by free-forming techniques, without the use of a die. These may involve the use of a reflector, in addition to the placement of the spark gap or bridgewire, to direct and concentrate the effect of the shock wave:

Example 550. Free-Forming an Annular Fold in Rolled and Welded Tube (Fig. 48)

The part shown in Fig. 48 was formed without a die from an 8½-in. length of rolled and welded tube 3 in. in diameter. The workpiece was plugged at one end with a pointed low-carbon steel reflector, as shown in Fig. 48, and at the other end with the energy-releasing spark gap. The part was filled with water.

The contour and dimensions of the reflector were developed to expand and fold the tube wall as shown in Fig. 48. Dimensions were reproducible to 0.06 in.

Electromagnetic Forming (EMF)

Operations generally similar to those described for the preceding two HERF methods can be carried out by electromagnetic forming (also called magnetic-pulse forming). In this process, the discharge of a capacitor through a coil generates an intense magnetic field. This field interacts with the electric currents induced in a conductive workpiece to produce a force perpendicular to the workpiece surface.

Details of the process and of equipment, tools and procedures are described in the article "Electromagnetic Forming", which begins on page 256.

The method is suitable for aluminum alloys because of their formability and high electrical conductivity.

Examples of Applications. The following two examples give an indication of the range of application of electromagnetic forming to aluminum alloys.

mple 551. Reverse Forming of a Tube ound a Steel Reinforcing Ring (Fig. 49)

the use of electromagnetic forming, a OD, 0.050-in.-wall tube of alloy 3003-O wrapped around a steel reinforcing ring was simultaneously bulged to lock the tightly in place in a permanent assembly (see Fig. 49). An expansion coil was located just inside the end of the tube. The end section of the tube accelerated to a high radial velocity in the first few thousandths of an inch of movement during the magnetic impulse. The major portion of the forming resulted from the kinetic energy of the metal, which caused the tube to wrap itself around the ring in a whiplike motion to produce the final form.

This assembly could not be produced economically by any method other than electromagnetic forming.

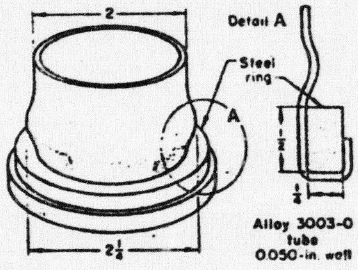

Fig. 49. Assembly produced in one step by electromagnetic reverse forming (Example 551)

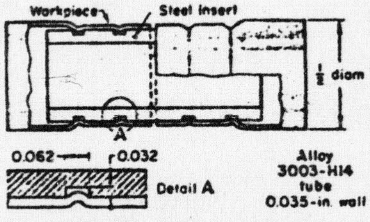

Fig. 50. Pressure-tight assembly produced by electromagnetically swaging an aluminum alloy tube onto a grooved steel insert (Example 552)

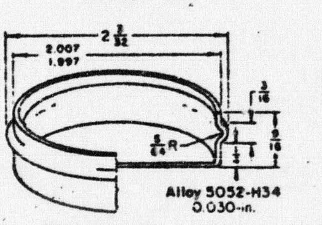

Fig. 51. Part that was produced at less cost in a punch press than by spinning (Example 553)

Pressure-tight joints, electrically or thermally conductive joints, torque joints, and structural joints between metals can be produced by EMF techniques in a variety of shapes. Joints between tubular members are the most common type. An example of such a joint is given below:

Example 552. Electromagnetic Swaging of a Tube Onto a Grooved Steel Insert (Fig. 50)

A metal-to-metal seal was produced by magnetic swaging of an alloy 3003-H14 tube onto a grooved tubular steel insert, as shown in Fig. 50, using a work coil and field-shaping insert that encircled the joint area. This seal remained intact at a pressure of 4000 psi, which was sufficient to burst the tube.

Selection of Method on the Basis of Quantity and Cost

The shape and size of the part to be formed usually limit the choice of a forming method to two or three techniques. Production cost for the given quantity then determines the method.

Punch-press operations are best suited for long runs, because of high production rates, whereas spinning, press-brake forming, circle shearing, routing, and other operations with low tooling costs are preferred for short runs.

The following five examples illustrate specific production situations.

Example 553. Spinning Replaced by Lower-Cost Forming in a Punch Press for Quantity Production (Fig. 51)

The part shown in Fig. 51 was initially purchased in quantities of about 500 per year from an outside source, which produced it by spinning. When demand for the part increased to 5000 per year, tooling was obtained for its in-plant production in a punch press. The use of a blank-and-draw die costing $425 and a bulging die costing $325 made it possible to produce the part for 25% of the former purchase price of 30¢ per piece. Blank size was developed to control the depth at $\frac{9}{16} \pm \frac{1}{64}$ in. and thereby avoid a final trimming operation.

Example 554. Production of a Barrel-Shape Bowl by Drawing, Trimming and Nosing in a Punch Press (Fig. 52)

A barrel-shape bowl was produced in annual quantities of 20,000 by drawing, trimming and nosing in separate operations in a punch press. The tooling setup for nosing is illus-

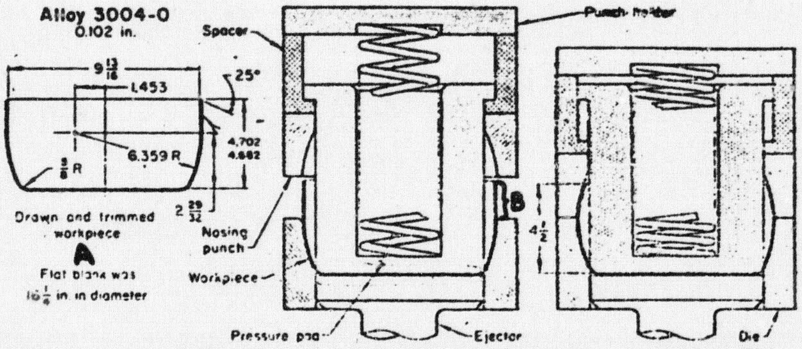

Fig. 52. Nosing a drawn and trimmed shell in a punch press to form a barrel-shape bowl (Example 554)

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TOOL ENGINEERING

PUNCHES, DIES
AND
GAGES

BY

ALBERT A. DOWD

Member American Society of Mechanical Engineers; Author of "Tools, Chucks, and Fixtures," "Tools and Patterns," "Modern Gaging Practice," "Jigs and Fixtures," Fixtures for Turning, Boring and Grinding," etc.

AND

FRANK W. CURTIS

Associate Member American Society of Mechanical Engineers; Associate Editor, American Machinist; Author "Cutting Speeds and Feeds," "Modern Gaging Practice," "Jigs and Fixtures," "Fixtures for Turning, Boring and Grinding," etc.

FIRST EDITION

McGRAW-HILL BOOK COMPANY, Inc.
NEW YORK: 370 SEVENTH AVENUE
LONDON: 6 & 8 BOUVERIE ST., E. C. 4
1925

completing the operation. The punch *M* which carries the pin *N* is obviously mounted on springs of sufficient stiffness to develop the necessary pressure in forming. These two examples illustrate the application of closing-in attachments to forming operations.

Dies which form a circular bead around the edge of round work and which bend the end of work in a circular bead are also called curling dies. Examples which illustrate the use of curling dies are butt-hinges, water pails, funnels, automobile horns, cooking utensils, etc. All of these parts have a curled portion which is made by a curling die, and although they may be entirely different, the principle used is the same in each case. Fig. 55 shows two examples of curling dies and illustrates the principles employed in work of this kind. At *A* is shown the work *B* which is to be curled in the die *C*. This die supports the back of the work, and as it is brought down the work curls around the formed edge *D* and produces the shape shown at *E*. The amount of curl obtained is governed by the stroke of the press. In most cases the curl is made as shown by the dotted lines at *F*.

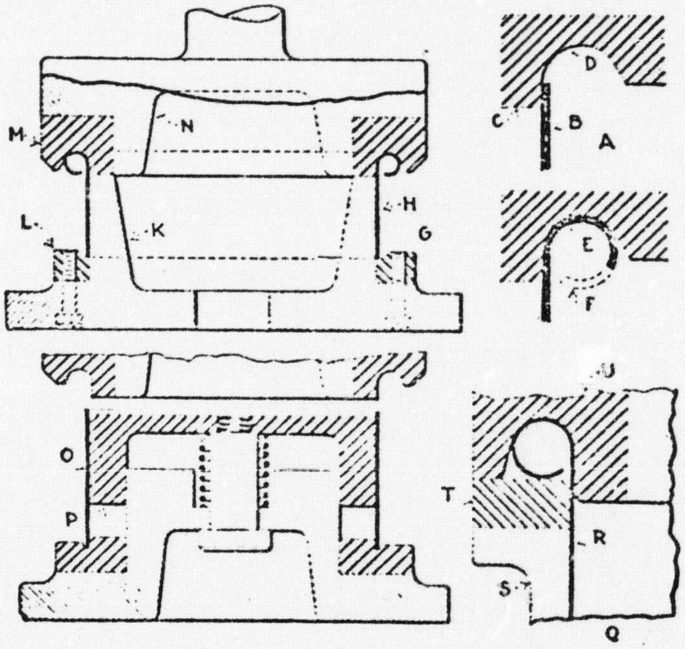

Fig. 55.—Two curling dies.

DEF A.E.

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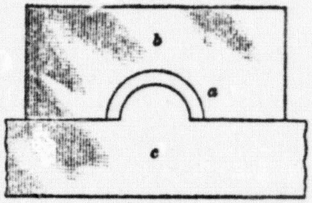

Fig. 38

in Fig. 38, where a thick piece of material *a* is shown between the bending surface of the die *b* and the lower section *c*. The curve of the upper die must have a radius equal to that of the lower die increased by the thickness of the metal. It must also be kept in mind that any material will bend more easily around a curve than over a sharp corner, and that there is less liability to rupture over a curve. All corners of a bending surface must be rounded off to a smooth curve. A thin ductile material, *SO,* can be bent over a smaller radius than harder or less ductile material, *ST.*

65. **Bending Dies.**—A right-angle bend of the type shown in Fig. 39, view (*a*), may be made by the plain bending die illustrated in view (*b*). The piece of stock *a* that is to be bent is sheared off to the proper length in a preceding operation, and is placed in the nest formed by the two locating stops *b* screwed to the top of the die block *c*. The punch *d* strikes the piece, forces it down into the die, and bends it to the desired shape. In making a die of this type for bending thin, soft material, the angle of the punch and the die may be the same as that desired in the finished piece. For heavy or hard material it is necessary to make the angle slightly less, to allow for a slight springback of the material after bending. The proper angle to which to make the die and the punch in that case depends on the kind, thickness, and temper of the material to be bent and must be determined by trial. The angle for a bending die for phosphor bronze or spring steel, for instance, must be considerably less than that required to make the same bend in soft aluminum. A slight radius must be left in the corner of the bend to prevent fracture of the material. The proper radius depends on the thickness and temper of the material to be formed, as well as on the sharpness of the angle. In general, however, a radius equal to the thickness of the material, or slightly more for hard materials, will prove sufficient.

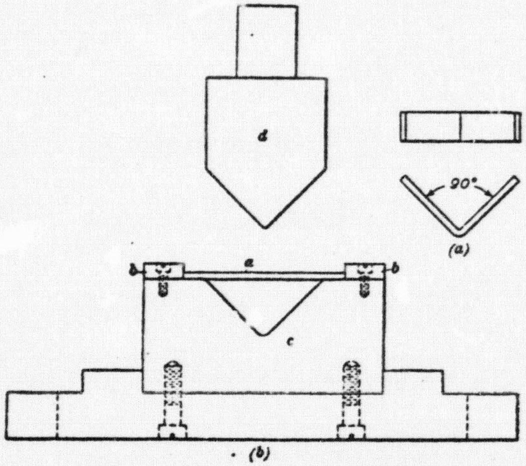

Fig. 39

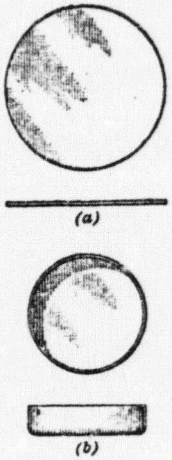

Fig. 40

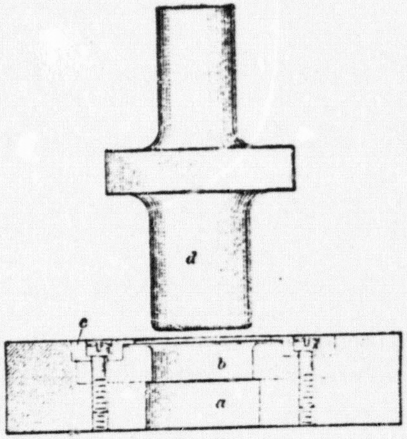

Fig. 41

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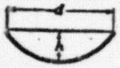
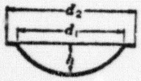
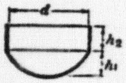
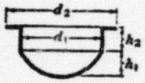
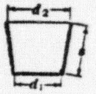
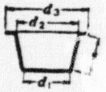
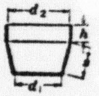
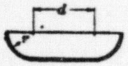
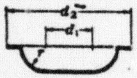
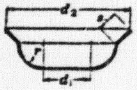
TABLE I—(*Continued*)

Form of Shell	Diameter of Blank
	$\sqrt{d^2+4h^2}$
	$\sqrt{d_2^2+4h^2}$
	$\sqrt{d^2+4(h_1^2+dh_2)}$
	$\sqrt{d_2^2+4(h_1^2+d_1h_2)}$
	$\sqrt{d_1^2+2s(d_1+d_2)}$
	$\sqrt{d_1^2-d_2^2+d_3^2+2s(d_1+d_2)}$
	$\sqrt{d_1^2+2s(d_1+d_2)+4d_2h}$
	$\sqrt{d^2+6.3rd+8r^2}$
	$\sqrt{d_2^2+2.3rd_1+4r^2}$
	$\sqrt{d_1^2+6.3rd_1+4r(2r+s)+2s(d_1+d_2)}$

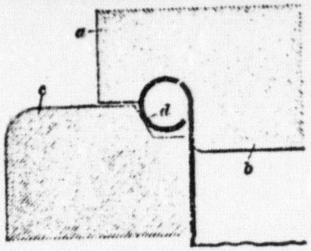
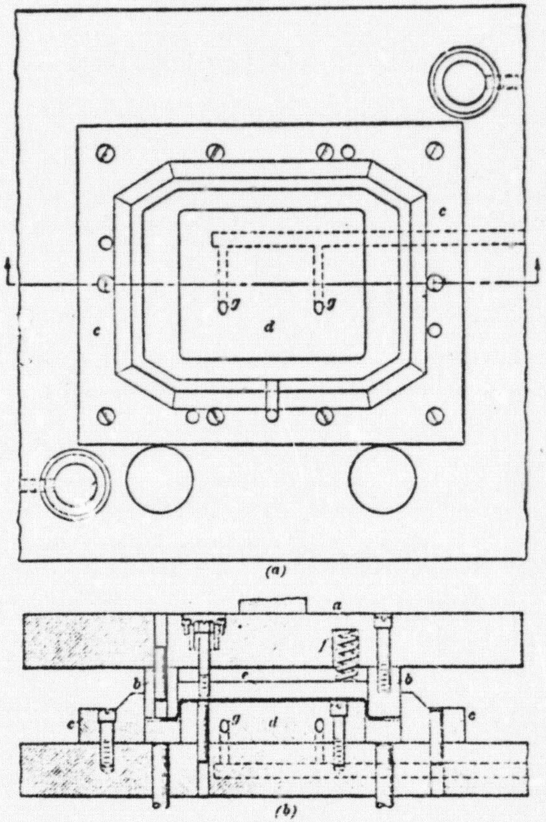


FIG. 43


c
c
g
g
d
a
f
e
b
b
c
c
g
d

(a)

(b)

FIG. 44

615a

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Def. BL 3 Datsko - Materials Properties and Manufacturing Processes 1966

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BLE 5-1. *(Continued)*

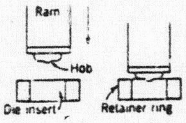
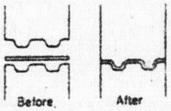
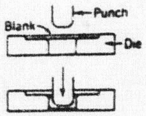
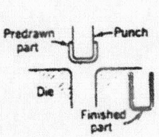
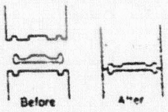
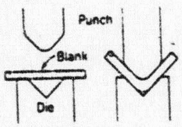
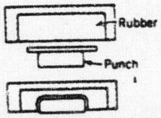
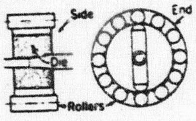
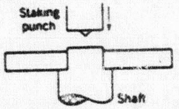
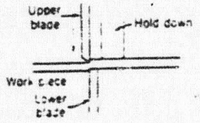
	n	*Sketch*	*Uses or Applications*
	ly ty by ned punch into a softer metal die block		Making many duplicate cavities, e.g. plastic molds for molding typewriter keys, plastic wall tile
Embossing	Forming a design on thin materials by raising or lowering portions of the material by localized bending		Forming ribs to increase rigidity. Making ornamental or communicative designs
Drawing (Deep, Cup)	Forming by pushing a formed punch against a flat sheet and forcing it over a shaped die-edge into the die cavity to take the shape of a recessed vessel.		Cups, shells short tubes, automotive bodies, gas tanks, appliance covers
Ironing	Forming by reducing the wall thickness of deep drawn parts by forcing them through a die with a punch wherein the clearance is less than the original wall thickness		For thinning and sizing walls of predrawn parts
Sizing	Finish forming operation, usually done on a preformed part, in closed dies to obtain very accurate dimensions		Accurate control of height or area of a formed part such as bosses

TABLE 5-1. (Continued)

Operation	*Definition or Description*	*Sketch*	*Uses or Applications*
Braking (Bending)	Forming of structural shapes such as angles and channels by bending sheets or plates in a long press called a brake		Structural shapes such as automobile and truck chassis. Angle and channel sections having large moment of inertia to weight ratio
Hydroform (Guerin Process) (Rubber Punch)	Bending or drawing operation in which either the punch or the die is a piece of constrained rubber		Low quantity of parts that could be made by drawing
Swagging	Forming operation in which the diameter of bars or tubes is changed by repeated blows of radially actuated shaped hammers		Flaring ends of tubes, reduction of tube or shaft diameter
Staking	Forcing a shaped punch into the top of a projection to complete a riveting operation		As a substitute to drilling and riveting
Shearing	A material separation operation using two knife blades or a punch and die wherein the material deformation is localized and due to shear forces		Rapid method of cutting bar stock or plates to length

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Defendants' Exhibit II

DEF. II

15432 EXHIBIT
CASE NO.____ TYPE C.V.
FULL EXHIBIT ☒
APR 1 0 1975
FOR IDENTIFICATION ☐
U. S. DISTRICT COURT
DISTRICT OF CONN.

EXPENSES INCURRED
PSI LAWSUIT

D. PFEIFFER	(SHOOTING FILM AMD EDITING)	6.5	HOURS AT 11.40/HOUR	$ 75.0
R. BROOKS	(FINANCIAL DATA-PRETRIAL HEARING)	20	HOURS AT 11.64/HOUR	230.0
D. KRAMER	(RESEARCH, TRIAL THRU APRIL 8TH)	160	HOURS AT 11.34/HOUR	1810.0
B. SNIEGOWSKI	(RESEARCH, TRIAL THRU APRIL 8TH)	160	HOURS AT 12.60/HOUR	2020.0
H. SOMMER	(RESEARCH, TRIAL THRU APRIL 8TH)	178	HOURS AT 17.50/HOUR	3115.0
A. HOSTAGE	(RESEARCH, TRIAL THRU APRIL 8TH)	20	HOURS AT 17.15/HOUR	345.0
SHOP PERSONNEL 3 PEOPLE (FILMING)		11	HOURS AT 3.50/HOUR	40.0
DEPOSITIONS ONLY: (HRS, BJS, AH, DK)		490	HOURS AT 14.65/HOUR	7180.0

EXPENSE OF WITNESS	
MOVIE FILM AND PROCESSING	70.0
PHOTOGRAPHS	70.0
ART SHOP (CHART PAPER, PENS)	40.0
R.T. REYNOLDS ASSOCIATES - FLIP CHARTS BOARDS	20.0
EXPENSES - H.R. SOMMER	600.0
LEGAL FEES THRU DECEMBER 31, 1974 Legal 15,750 Disb. 1990.60	210.0
	17740.0
SUB-TOTAL	$33565.0
LEGAL FEES JANUARY 1, 1975 THRU APRIL 8, 1975 Legal 11888 Disb. 168	12056.0
TOTAL EXPENSES TO DATE	$45621.0
STIMATE TO COMPLETE:	
LEGAL FEES - APRIL 9, 1975 TO END Legal 8000 Disb.-4000	$12000.0

. SNIEGOWSKI	86 HOURS AT 12.60/HOUR	1080.0
. SOMMER	106 HOURS AT 17.50/HOUR	1855.0
. KRAMER	86 HOURS AT 11.34/HOUR	975.0

XPENSES TO COMPLETE	$15910.0
RAND TOTAL	$61531.0

STATE OF NEW YORK,
COUNTY OF NEW YORK, *ss.*:

Joseph Boselli, being duly sworn, deposes and says, that on the 13th day of August 19 76, at 12 o'clock noon ~~M.~~ he served the annexed Joint Appendix, No. 76-7233, in RE: Pressure Science, Inc. v. David Kramer and The Advanced Products Co.

upon Carter La Prade, Esq.

Esq(~~s~~)., Attorney(~~s~~)

for Defendant-Appellee- (David Kramer)

by depositing 2 true copies

thereof in a Post Office Box regularly maintained by the Government of the United States and under the care of the Postmaster of the City of New York at Village Station, New York, N. Y. 10014, enclosed in a securely closed wrapper with the postage thereon prepaid, addressed to said attorney(~~s~~) at (~~his~~/their) office

Thompson, Weir & Barclay, 205 Church St. New Haven, Conn. 06510

that being the address designated in the last papers served herein by the said attorney.

Joseph Boselli

Sworn to before me this 13th
day of August 19 76

John Alusick

STATE OF NEW YORK,
COUNTY OF NEW YORK, *ss.*:

Joseph Boselli , being duly sworn, deposes and says, that on the 13th day of August 1976 , at 12 o'clock noon ~~M~~. he served the annexed Joint Appendix No. 76-7233, in RE: Pressure Science Inc. v. David Kramer and The Advanced Products Co.

upon Shaun S. Sullivan, Esq.

Esq(~~s~~)., Attorney(~~s~~)

for Defandant-Appellee (The Advanced Products Co.)

by depositing 2 true copies

thereof in a Post Office Box regularly maintained by the Government of the United States and under the care of the Postmaster of the City of New York at Village Station, New York, N. Y. 10014, enclosed in a securely closed wrapper with the postage thereon prepaid, addressed to said attorney(s) at (his/their) office

Wiggan & Dana, P.O. Box 1832- 195 Church St. New Haven, Conn.
06508

that being the address designated in the last papers served herein by the said attorney. Joseph Boselli

Sworn to before me this 13th

day of August 19 76

John Alusick

JOHN ALUSICK